Message

From: Rick Turville [rick@spectralsystemsglobal.com]
Sent: 9/8/2021 8:46:29 PM
To: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
CC: Mark@SpectralSystemsGlobe.com
Subject: Revised ASPECT report for 7 Sept 2021
Attachments: ASPECT Summary - Hurricane Ida 7 September 2021 V2.docx

Jill,
Here is the revised ASPECT report for 7 September 2021. Tables 2 and 3 (met data) have both been replaced. If you have any questions please let us know.

R/ Rick

90045048

Airborne
Spectral
Photometric
Environmental
Collection
Technology

ASPECT Air Quality Survey
Baton Rouge, LA.
September 7, 2021

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Acronyms and Abbreviations

Alt	Altitude (in feet)
AGL	Above Ground Level
cm	centimeter
CDT	Central Daylight Time
DEM	Digital Elevation Model
ESF-10	Emergency Support Function #10 – Oil and Hazardous Materials Response
FEMA	Federal Emergency Management Agency
ft	feet
FTIR	Fourier Transform Infrared Spectrometer
FTP	File Transfer Protocol
igm	Spectral data format based on grams format
IR	Infrared
IRLS	Infrared Line Scanner
jpg	JPEG image format
kts	knots
mph	miles per hour
m/s	meters per second
MSIC	Digital photography file from the Imperx mapping camera
MSL	Mean Sea Level Altitude (in feet)
PAN	peroxyacetyl nitrate
Ppm	parts per million
RMP	Risk Management Plan

UTC	Universal Time Coordinated

Executive Summary

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 30 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2nd, 2021, the State of Louisiana requested ESF-10 assistance through FEMA and Region 6 asked for the ASPECT plane to be deployed in support of the response to Hurricane Ida. The state wanted assistance monitoring facility emissions in the industrial area between Baton Rouge and New Orleans, where flaring is resulting in the visible emission of black smoke.

ASPECT was tasked to perform remote chemical sensing over target properties to screen for airborne chemicals and take high-resolution photos to provide situational awareness. Potential areas identified for monitoring included: East Baton Rouge, Ascension, Iberville, St. James, St. John, St. Charles, Jefferson, and Orleans. The system conducted one flight mission on 2 September 2021 including air monitoring survey collections over the target area with favorable weather conditions for all passes. Although two black plumes were visible over one of the sites, no major emissions were detected with the FTIR.

A continuation of the overall Baton Rouge facility survey was conducted on 3 September 2021. Two data collection flights were conducted which bracketed a Presidential temporary flight restriction not allowing any flight activity. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Flight 5 and 6 were conducted as part of survey operations conducted on 4 September 2021. A total of 17 facilities were surveyed. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm in addition to ozone and peroxyacetyl nitrate. Analysis of IR imagery indicated that some facilities are showing hot process units.

ASPECT conducted two data collection missions on 5 September 2021 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Two data collection missions were conducted by ASPECT on 7 September 2021 with the primary focus to collect additional data over target surveyed on 5 September 2021 (St.

Bernard, Terrebonne, St. Charles, and St. James areas). A total of 16 data collection passes (2 test and 14 active) were made over about half of the target list. Weather conditions complicated the mission with numerous convective cells and low clouds in the area. No compounds were detected on either flight. conducted two data collection missions on 5 September 2021 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas.

ASPECT Air Quality Survey
Hurricane IDA
Baton Rouge, LA
September 7, 2021

Background and Operational Overview

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 30 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On 2 September 2021, ASPECT was tasked to conduct a wide area air quality screening level assessment of areas populated with Risk Management Plan (RMP) sites and petrochemical facilities using the ASPECT system for detections of any airborne contaminants from ASPECT's 76 chemical detection library in the areas affected by Ida. The Region wanted to know if any detections were found, the location of the detection, and the concentration detected. Sites including Marathon Petroleum Company, Shell Norco Facility, and Phillips 66 pipeline site were surveyed. There were no chemical detections at the sites surveyed. Extremely slow satellite transmission speeds (possibly due to high bandwidth use by other first responders) resulted in long delays in data collection. Some chemical photos were pulled down during flight, with the majority needing to be pulled down with a more high-speed internet connection on the ground.

On 3 September 2021 ASPECT was tasked with a continuation of the general Baton Rouge area survey and conducted two flights. 8 locations in the Baton Rouge area were surveyed as part of two flights. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Two data collection flights were conducted on 4 September 2021 focusing on facilities south of Baton Rouge. A total of 29 active data collection passes were made covering 17 facilities. Analysis of IR imagery indicated that some facilities are showing hot process units. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm.

ASPECT conducted two data collection missions on 5 September 2021 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Due to poor weather, ASPECT did not conduct any flight activities on 6 September 2021. ASPECT was tasked with two missions on 7 September consisting largely of revisiting facilities surveyed on 6 September 2021 for the purpose of collecting additional data.

Table 1. Sites Covered on 7 September 2021 Flights 9 and 10

Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Dyno Nobel LA Ammonia LLC - Ammonia Production Facilty	29.964789	-90.264625	Jefferson
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles

General Mission Objectives

Once granted access to fly over the sites, the following general mission objectives were employed in conducting data collection with ASPECT:

1. To capture an overall, situational awareness of the incident using aerial photography with:
    - Oblique camera—photos taken by hand from the view/position of the co-pilot, and
    - MSIC photos—advanced camera mounted underneath the plane for a top-down view of the designated sites.

2. To qualitatively locate and characterize any the visible and non-visible components of a plume, as well as any areas on fire:
    - Using the Infrared Line Scanner (IRLS)
3. To screen for the presence and location of specific chemicals within ASPECT's automated chemical detection library:
    - Using the Fourier Transform Infrared (FTIR) Spectrometer

Flight Conditions and Status

Weather and Site Conditions

Prior to each flight, an updated status of the current and forecasted weather, site conditions and any potential flight obstacles including radio towers impacting safety is assessed by the crew. A summary of the ground weather conditions during the missions can be found in Table 2 and 3.

Table 2. Ground Weather for Baton Rouge, LA, Flight 9
7 September 2021

Time	853	953	1053	1153	1253	1353
Wind direction	45 degrees NE	45 degrees NE	67.5 degrees ENE	0 degrees N	45 degrees NE	90 degrees E
Wind speed	2.2 m/s (5.0 mph)	2.2 m/s (5.0 mph)	2.2 m/s (5.0 mph)	2.7 m/s (6.0 mph)	3.1 m/s (7.0 mph)	2.7 m/s (6.0 mph)
Temperature	25.0 C	25.0 C	27.8 C	28.9 C	30.6 C	31.1 C
Relative humidity	90	90	82	75	68	61
Dew point	23.3 C	23.3 C	24.4 C	23.9 C	23.9 C	22.8 C
Pressure	1012.3 mb	1012.3 mb	1012.3 mb	1012.3 mb	1011.6 mb	1010.6 mb
Ceiling	Scattered 800 Ft	Scattered 800 Ft	Broken 1200 Ft	Scattered 2100 Ft	Scattered 2100 Ft	Few 3600 Ft

Table 3. Ground Weather for Baton Rouge, LA, Flight 10
7 September 2021

Time	1353	1451	1553	1653	1753
Wind direction	90 degrees E	112.5 degrees ESE	135 degrees SE	90 degrees E	112.5 degrees ESE
Wind speed	2.7 m/s (6.0 mph)	3.1 m/s (7.0 mph)	2.2 m/s (5.0 mph)	2.7 m/s (6.0 mph)	2.7 m/s (6.0 mph)
Temperature	31.1 C	30.0 C	27.8 C	28.9 C	28.9 C
Relative humidity	61	66	70	65	72
Dew point	22.8 C	22.8 C	21.7 C	21.7 C	23.3 C
Pressure	1010.6 mb	1010.2 mb	1009.5 mb	1009.5 mb	1009.9 mb
Ceiling	Few 3600 Ft	Thu 3600 Ft	Lt 3600 Ft	Clear	Few 8000 Ft

Data Results

The following data is provided as a summary analysis. All data products are available for the Region to access on a shared FTP site. For a complete list of available products, see Appendix A. The data collected during these missions included a flight path summary, IRLS images, FTIR chemical identification and quantification, high resolution MSIC photos, and oblique photos.

Flight Paths

Wide, slow turns are required to be made in between runs to keep the instruments stable. The blue lines indicate the flight path while the green lines indicate the specific sections of the flight where chemical data was collected and processed. On Flight 1 the St. Bernard, Terrebonne, St. Charles, and St. James area was surveyed, and the flight path is shown in Figure 1 and 2.

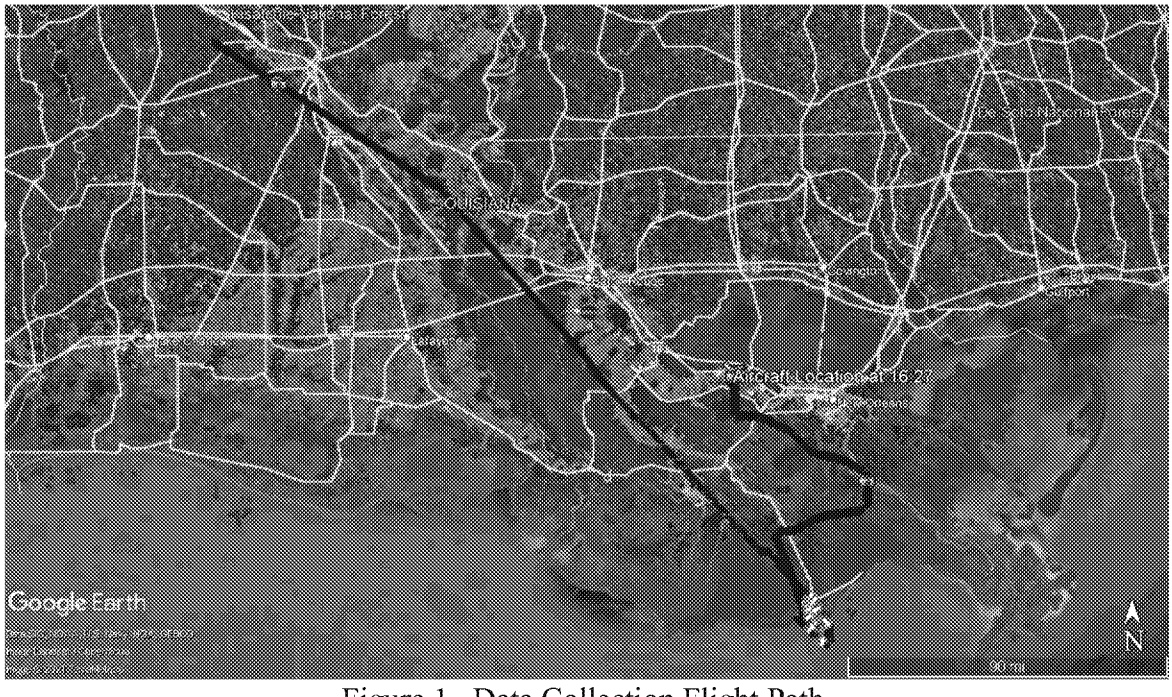

Figure 1. Data Collection Flight Path,
St. Bernard, Terrebonne, St. Charles, and St. James, Fight 9,
7 September 2021

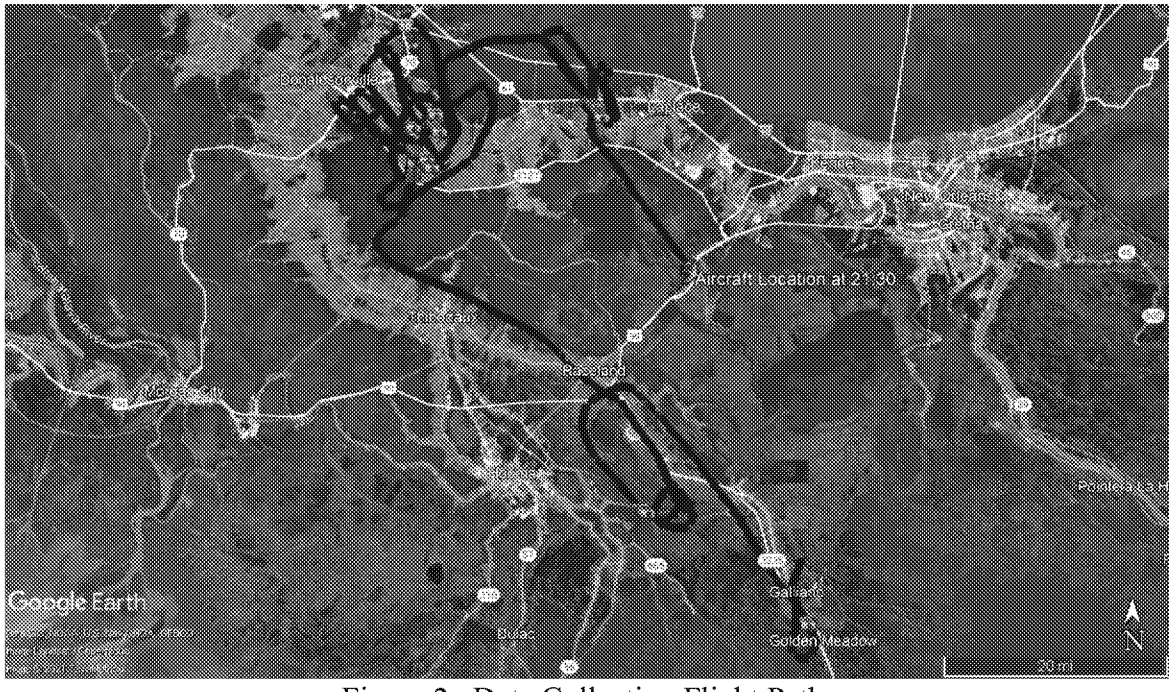

Figure 2. Data Collection Flight Path,
St. Bernard, Terrebonne, St. Charles, and St. James, Fight 10,
7 September 2021

Line Scanner Data Results

A total of 16 data collection runs (2 test and 14 active) were made over the target facilities and an infrared line scanner image was generated for each collection run. Figure 4 shows a 3-band infrared image collected over a facility near Garyville. No significant features are evident in the image (such as flare or steam vents) and no discharges can be seen leaving the facility.

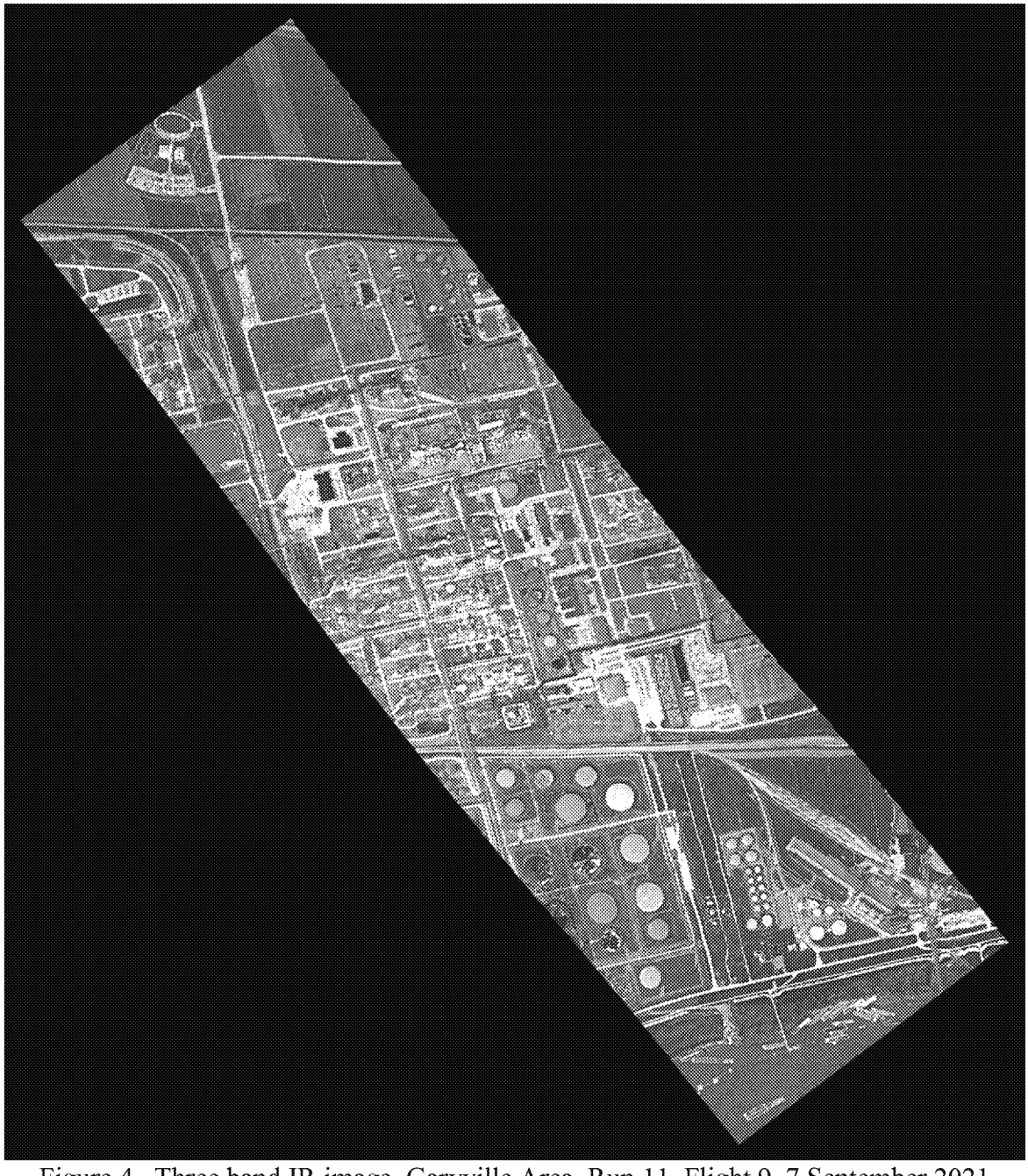

Figure 4. Three band IR image, Garyville Area, Run 11, Flight 9, 7 September 2021

FTIR Data Results

FTIR spectral data at a resolution of 16 wavenumbers was collected for each run. ASPECT uses an automated detection algorithm to permit compounds to be automatically analyzed while the aircraft is in flight. Seventy-six chemical compounds are included in the airborne

algorithm library (the list is provided in Appendix B, Table 1). In addition, collected data was also manually quality checked against a collection of published library spectra for each chemical detected.

ASTECT did not detect any programmed compounds (those found in Appendix B, Table 1) as part of the mission over the target areas on the two flights conducted on 7 September 2021. Details of the monitoring results can be found in Table 4 and 5.

Table 4. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 9

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-07	14:06:47	Test	Test
2		15:34:20	ND	ND
3		16:05:22	ND	ND
4		16:26:25	ND	ND

Table 5. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 10

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-07	19:03:23	Test	Test
2		19:22:25	ND	ND
3		19:52:24	ND	ND
4		19:54:57	ND	ND
5		20:11:16	ND	ND
6		20:12:24	ND	ND
7		20:28:48	ND	ND
8		20:41:54	ND	ND
9		20:54:50	ND	ND
10		21:06:26	ND	ND
11		21:16:22	ND	ND
12		21:30:25	ND	ND

Aerial Photography Results

A full set of high-resolution aerial digital photography were collected as part of each data collection pass. Weather conditions over the survey were challenging with both low ceiling and convective activity within the survey areas. These conditions made some images marginal. Figures 5 shows a representative aerial image collected over a refinery in the Garyville area. No significant damage or activity is evident in the image. Figure 6 shows

an oblique image of a flooded tank battery near Port Fourchon. Although flooded, no product appears to be leaking from the facility.

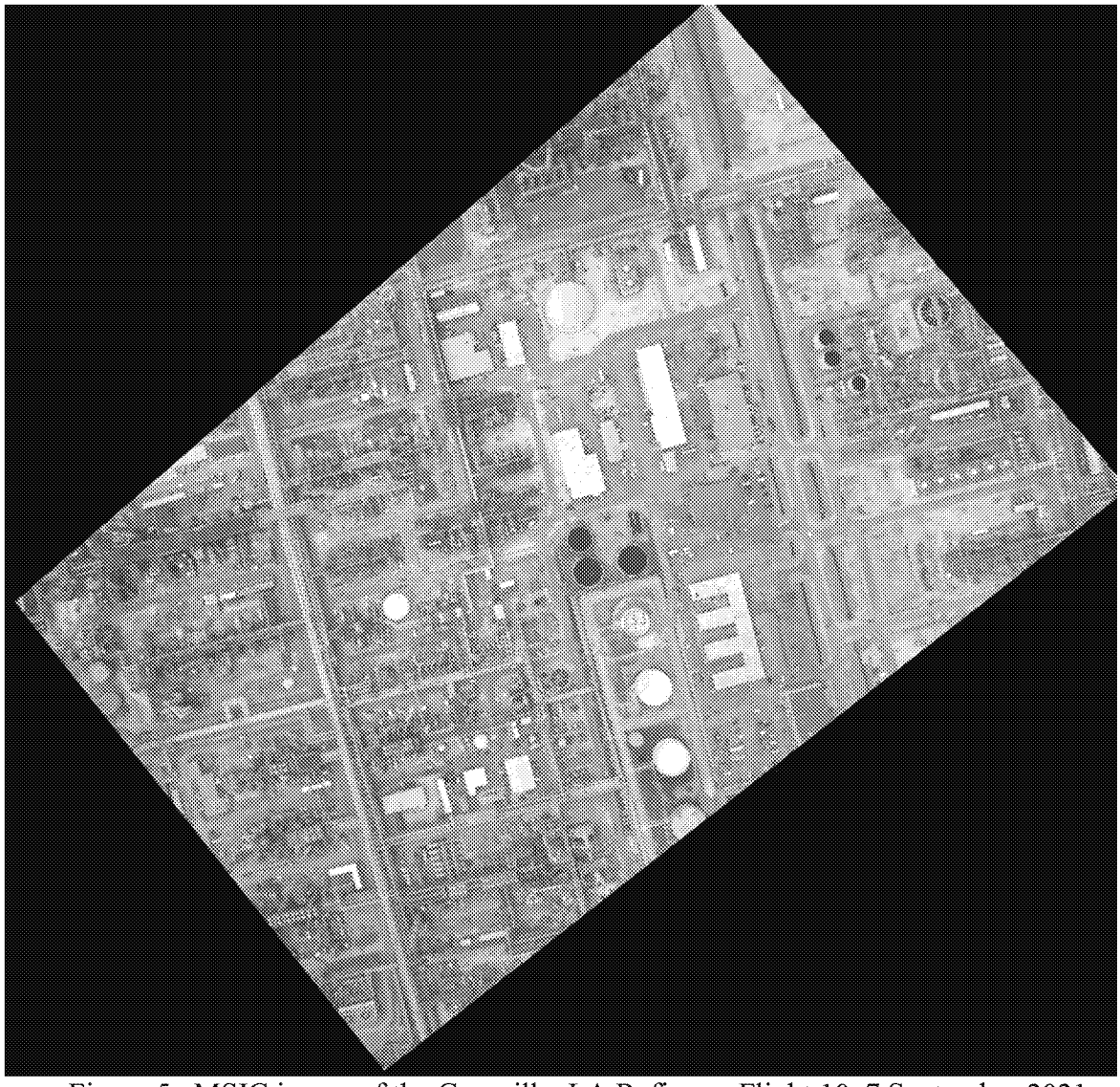

Figure 5. MSIC image of the Garyville, LA Refinery, Flight 10, 7 September 2021

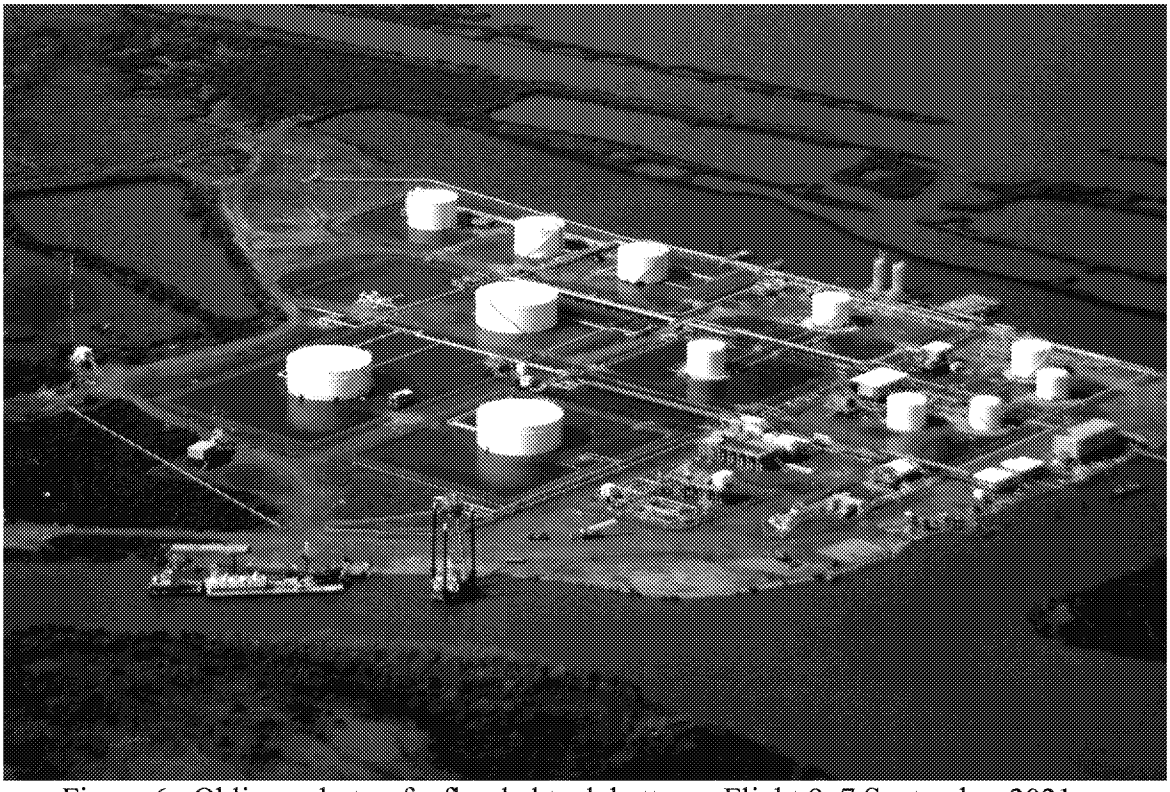

Figure 6. Oblique photo of a flooded tank battery. Flight 9, 7 September 2021

Conclusion

Two data collection missions were conducted by ASPECT on 7 September 2021 with the primary focus to collect additional data over target surveyed on 5 September 2021 (St. Bernard, Terrebonne, St. Charles, and St. James areas). A total of 16 data collection passes (2 test and 14 active) were made over about half of the target list. Weather conditions complicated the mission with numerous convective cells and low clouds in the area. No compounds were detected on either flight. conducted two data collection missions on 5 September 2021 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas.

Appendix A: File Names of Data Collected During Flight

St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 9, 7 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	14:06:47	5147	150	20210907140653888.jpg 20210907140700247.jpg 20210907140706596.jpg	20210907_140651_A.igm	2021_09_07_14_06_51_R_01 TA=25.0;TB=45.5;Gain=3	
2	15:34:20	2563	105	20210907153426146.jpg 20210907153432495.jpg 20210907153438860.jpg 20210907153445210.jpg 20210907153451568.jpg 20210907153457918.jpg 20210907153505181.jpg 20210907153511546.jpg	20210907_153423_A.igm 20210907_153502_A.igm	2021_09_07_15_34_24_R_02 TA=16.0;TB=36.0;Gain=3	
3	16:05:22	2534	108	20210907160528252.jpg 20210907160534601.jpg 20210907160540960.jpg	20210907_160525_A.igm	2021_09_07_16_05_26_R_03 TA=25.1;TB=45.0;Gain=3	
4	16:26:25	2063	107	20210907162632040.jpg 20210907162637485.jpg 20210907162642033.jpg 20210907162647478.jpg 20210907162652923.jpg	20210907_162628_A.igm	2021_09_07_16_26_30_R_04 TA=26.0;TB=46.0;Gain=3	

St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 10, 7 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	19:03:23	2589	114	20210907190329891.jpg 20210907190335335.jpg 20210907190340787.jpg	20210907_190327_A.igm	2021_09_07_19_03_28_R_01 TA=25.9;TB=46.7;Gain=3	
2	19:22:25	2572	102	20210907192232007.jpg 20210907192237452.jpg 20210907192242896.jpg 20210907192248344.jpg 20210907192253803.jpg 20210907192259248.jpg	20210907_192229_A.igm	2021_09_07_19_22_30_R_02 TA=26.0;TB=46.2;Gain=3	
3	19:52:24	2535	106	20210907195230529.jpg 20210907195235973.jpg 20210907195241418.jpg 20210907195246872.jpg 20210907195252316.jpg 20210907195257760.jpg 20210907195303220.jpg 20210907195308665.jpg 20210907195314109.jpg 20210907195319553.jpg	20210907_195227_A.igm 20210907_195306_A.igm	2021_09_07_19_52_29_R_03 TA=25.9;TB=46.0;Gain=3	
4	19:54:57	2507	104	20210907195503059.jpg 20210907195508503.jpg 20210907195513947.jpg 20210907195519392.jpg 20210907195524836.jpg 20210907195530296.jpg 20210907195535740.jpg	20210907_195501_A.igm	2021_09_07_19_55_01_R_04 TA=26.0;TB=46.0;Gain=3	

5	20:11:16	2576	105	20210907201122663.jpg 20210907201128108.jpg 20210907201133568.jpg	20210907_201120_A.igm	2021_09_07_20_11_21_R_05 TA=26.0;TB=46.0;Gain=3	
6	20:12:24	2549	102	20210907201230757.jpg 20210907201236202.jpg 20210907201238932.jpg	20210907_201227_A.igm	2021_09_07_20_12_29_R_06 TA=26.0;TB=46.0;Gain=3	
7	20:28:48	2563	106	20210907202854916.jpg 20210907202900361.jpg 20210907202905805.jpg 20210907202911250.jpg 20210907202916710.jpg 20210907202922154.jpg 20210907202927604.jpg 20210907202933048.jpg 20210907202938492.jpg 20210907202943937.jpg 20210907202949381.jpg 20210907202954841.jpg 20210907203000286.jpg 20210907203005730.jpg	20210907_202851_A.igm 20210907_202932_A.igm	2021_09_07_20_28_54_R_07 TA=25.1;TB=44.9;Gain=3	
8	20:41:54	2593	110	20210907204200238.jpg 20210907204205682.jpg 20210907204211142.jpg 20210907204216587.jpg	20210907_204156_A.igm	2021_09_07_20_41_58_R_08 TA=27.3;TB=47.1;Gain=3	
9	20:54:50	2552	105	20210907205456491.jpg 20210907205501935.jpg 20210907205507380.jpg 20210907205512825.jpg 20210907205518285.jpg 20210907205523730.jpg	20210907_205453_A.igm	2021_09_07_20_54_55_R_09 TA=18.3;TB=38.5;Gain=3	
10	21:06:26	2544	101	20210907210632840.jpg 20210907210638285.jpg 20210907210643729.jpg 20210907210649189.jpg 20210907210654634.jpg 20210907210700078.jpg 20210907210705523.jpg 20210907210710967.jpg 20210907210716427.jpg 20210907210721871.jpg	20210907_210630_A.igm 20210907_210710_A.igm	2021_09_07_21_06_32_R_10 TA=25.6;TB=45.5;Gain=3	
11	21:16:22	2578	103	20210907211628411.jpg 20210907211633863.jpg 20210907211639307.jpg 20210907211644767.jpg 20210907211650212.jpg 20210907211655656.jpg 20210907211701101.jpg 20210907211706545.jpg 20210907211711993.jpg 20210907211717439.jpg 20210907211722899.jpg	20210907_211625_A.igm 20210907_211705_A.igm	2021_09_07_21_16_27_R_11 TA=23.5;TB=43.5;Gain=3	
12	21:30:25	2570	108	20210907213031849.jpg 20210907213037293.jpg 20210907213042753.jpg	20210907_213029_A.igm	2021_09_07_21_30_31_R_12 TA=23.0;TB=42.8;Gain=3	

Appendix B: Priority Sites Provided by EPA Region 6 & Louisiana Department of Environmental Quality

Facility_Name	Latitude	Longitude	Parish
Deltech LLC - Baton Rouge Facility	30.552892	-91.200536	East Baton Rouge
ExxonMobil Chemical Co - Baton Rouge Plastics Plant	30.551419	-91.175611	East Baton Rouge
ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644	East Baton Rouge
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Westlake Vinyls Co LP	30.209167	-91.017222	Ascension
Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219	East Baton Rouge
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586	Iberville
Rubicon LLC - Geismar Facility	30.20139	-91.01222	Ascension
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622	St. Charles
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145	Plaquemines
Axiall LLC - Plaquemine Facility	30.267167	-91.184258	Iberville
ExxonMobil Fuels & Lubricants Co - Baton Rouge Refinery	30.484392	-91.169444	East Baton Rouge
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387	East Baton Rouge
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884	Ascension
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles

BASF Corp - North Geismar Site	30.20594	-90.99195	Ascension
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333	Iberville
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist
Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472	St. John the Baptist
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508	Iberville
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333	Iberville
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631	Iberville
Targa Midstream Services LLC	29.237034	-89.384977	Plaquemines
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389	Iberville
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944	Terrebonne
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958	St. Charles
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833	Ascension
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278	Iberville
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833	Ascension
Dyno Nobel LA Ammonia LLC - Ammonia Production Facilty	29.964789	-90.264625	Jefferson
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792	Ascension
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles
CF INDUSTRIES	30.08328	-90.957665	Ascension

Appendix C: ASPECT Systems

The US EPA ASPECT system collects airborne infrared (IR) images and chemical screening data from a safe distance over the site (about 3,000 ft AGL). The system consists of an airborne high-speed Fourier Transform Infra-Red (FTIR) spectrometer coupled with a wide-area IR Line Scanner (IRLS). The ASPECT IR systems can detect chemical compounds in both the 8-to-12-micron (800 to 1200 cm-1) and 3 to 5 micron (2000 to 3200 cm-1) regions. List of chemicals and detection limits are listed in Table 1. The 8 to 12 micron region is typically known as the atmospheric window region since the band is reasonably void of water and carbon dioxide influence. Spectrally, this region is used to detect carbon - non-carbon bonded compounds. The 3 to 5 micron region is also free of water and carbon dioxide but typically does not have sufficient energy for use. This band does show use in high-energy environments such as fires. The carbon - hydrogen stretch is very common in this region.

An Imperx mapping camera (29 mega pixels; mapping focal plane array) is concurrently operated as part of all chemical collections. These images are often digitally processed in lower resolution, so they can be transmitted via satellite communication. All imagery is geo-rectified using both aircraft attitude correction (pitch, yaw, and roll) and GPS positional information. Imagery can be processed while in flight or approximately 600 frames per hour can be processed once the data are downloaded from the aircraft. The high-resolution images (>20 MB each) are pulled from the ASPECT after the sortie and are available later.

All aerial photographic images collected by the ASPECT system are ortho-rectified and geospatially validated by the scientific reach back team. In general, this consists of conducting geo-registration using a USGS Digital Elevation Model (DEM) which promotes superior pixel computation and lessens topographic distortion. The image is check by the team (using a Google Earth base map) for proper location and rotation.

Airborne radiological measurements are conducted using three fully integrated multi-crystal sodium iodide (NaI) RSX4 gamma ray spectrometers. Each RSX4 spectrometer contains four 4"x2"x16" doped NaI crystals each having an independent photomultiplier/ spectrometer assembly. One RSX unit is configured with an additional upward NaI crystal utilized to provide real-time cosmic ray correction. Count and energy data from each crystal and pack is combined using a self-calibrating signal processor to generate a virtual detector output. All radiological spectrometer "packs" are further combined using a signal console controlled by the on-board central computer in the aircraft. Altitude correction data is provided by a radar altimeter with internal GPS systems within the packs serving as a backup. It should be noted that no radiological measurements were conducted on this mission.

Data is processed using automated algorithms onboard the aircraft with preliminary results being sent using a satellite system to the ASPECT scientific reach back team for QA/QC analysis. Upon landing, preliminary data results are examined and validated by the

scientific reach back team.

Table 1. ASPECT Automated Compounds

This table contains ASPECT's library of automated compounds.
Detection limits are for each chemical is found in parenthesis in units of parts per million (ppm)

Acetic Acid (2.0)	Cumene (23.1)	Isoprene (6.5)	Phosphine (8.3)
Acetone (5.6)	Diborane (5.0)	Isopropanol (8.5)	Phosphorus Oxychloride (2.0)
Acrolein (8.8)	1,1-Dichloroethene (3.7)	Isopropyl Acetate (0.7)	Propyl Acetate (0.7)
Acrylonitrile (12.5)	Dichloromethane (6.0)	MAPP (3.7)	Propylene (3.7)
Acrylic Acid (3.3)	Dichlorodifluoromethane (0.7)	Methyl Acetate (1.0)	Propylene Oxide (6.8)
Allyl Alcohol (5.3)	1,1-Difluoroethane (0.8)	Methyl Acrylate (1.0)	Silicon Tetrafluoride (0.2)
Ammonia (2.0)	Difluoromethane (0.8)	Methyl Ethyl Ketone (7.5)	Sulfur Dioxide (15)
Arsine (18.7)	Ethanol (6.3)	Methanol (5.4)	Sulfur Hexafluoride (0.07)
Bis-Chloroethyl Ether (1.7)	Ethyl Acetate (0.8)	Methylbromide (60)	Sulfur Mustard (6.0)
Boron Tribromide (0.2)	Ethyl Acrylate (0.8)	Methylene Chloride (1.1)	Sulfuryl Fluoride (1.5)
Boron Triflouride (5.6)	Ethyl Formate (1.0)	Methyl Methacrylate (3.0)	Tetrachloroethylene (10)
1,3-Butadiene (5.0)	Ethylene (5.0)	MTEB (3.8)	1,1,1-Trichloroethane (1.9)
1-Butene (12.0)	Formic Acid (5.0)	Naphthalene (3.8)	Trichloroethylene (2.7)
2-Butene (18.8)	Freon 134a (0.8)	n-Butyl Acetate (3.8)	Trichloromethane (0.7)
Carbon Tetrachloride (0.2)	GA (Tabun) (0.7)	n-Butyl Alcohol (7.9)	Triethylamine (6.2)
Carbonyl Fluoride (0.8)	GB (Sarin) (0.5)	Nitric Acid (5.0)	Triethylphosphate (0.3)
Carbon Tetraflouride (0.1)	Germane (1.5)	Nitrogen Mustard (2.5)	Trimethylamine (9.3)
Chlorodifluoromethane (0.6)	Hexafluoroacetone (0.4)	Nitrogen Trifluoride (0.7)	Trimethyl Phosphite (0.4)
Chloromethane (12)	Isobutylene (15)	Phosgene (0.5)	Vinyl Acetate (0.6)

Message

From: Rick Turville [rick@spectralsystemsglobal.com]
Sent: 9/8/2021 8:49:08 PM
To: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
CC: Mark@SpectralSystemsGlobe.com
Subject: Revision to ASPECT report for 4 Sept 2021
Attachments: ASPECT Summary - Hurricane Ida 4 September 2021 V3.docx

Jill,

Please find attached a minor revision for the report on 4 Sept 2021. The met data in table 3 for flight 6 was not correct. It has been corrected. You will also see revisions for flights 8, 9, and 10 coming shortly with the same issue.

Please let us know if you have any questions.

R/ Rick

Airborne
Spectral
Photometric
Environmental
Collection
Technology

ASPECT Air Quality Survey
Baton Rouge, LA.
September 4, 2021

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ED_006338_00001236-00001

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Acronyms and Abbreviations

Alt	Altitude (in feet)
AGL	Above Ground Level
cm	centimeter
CDT	Central Daylight Time
DEM	Digital Elevation Model
ESF-10	Emergency Support Function #10 – Oil and Hazardous Materials Response
FEMA	Federal Emergency Management Agency
ft	feet
FTIR	Fourier Transform Infrared Spectrometer
FTP	File Transfer Protocol
igm	Spectral data format based on grams format
IR	Infrared
IRLS	Infrared Line Scanner
jpg	JPEG image format
kts	knots
mph	miles per hour
m/s	meters per second
MSIC	Digital photography file from the Imperx mapping camera
MSL	Mean Sea Level Altitude (in feet)
PAN	peroxyacetyl nitrate
Ppm	parts per million
RMP	Risk Management Plan

UTC	Universal Time Coordinated

Executive Summary

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 30 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2nd, 2021, the State of Louisiana requested ESF-10 assistance through FEMA and Region 6 asked for the ASPECT plane to be deployed in support of the response to Hurricane Ida. The state wanted assistance monitoring facility emissions in the industrial area between Baton Rouge and New Orleans, where flaring is resulting in the visible emission of black smoke.

ASPECT was tasked to perform remote chemical sensing over target properties to screen for airborne chemicals and take high-resolution photos to provide situational awareness. Potential areas identified for monitoring included: East Baton Rouge, Ascension, Iberville, St. James, St. John, St. Charles, Jefferson, and Orleans. The system conducted one flight mission on 2 September 2021 including air monitoring survey collections over the target area with favorable weather conditions for all passes. Although two black plumes were visible over one of the sites, no major emissions were detected with the FTIR.

A continuation of the overall Baton Rouge facility survey was conducted on 3 September 2021. Two data collection flights were conducted which bracketed a Presidential temporary flight restriction not allowing any flight activity. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Flight 5 and 6 were conducted as part of survey operations conducted on 4 September 2021. A total of 17 facilities were surveyed. No compounds were detected other than levels of ozone and peroxyacetyl nitrate. Analysis of IR imagery indicated that some facilities are showing hot process units.

ASPECT Air Quality Survey
Hurricane IDA
Baton Rouge, LA
September 4, 2021

Background and Operational Overview

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 30 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On 2 September 2021, ASPECT was tasked to conduct a wide area air quality screening level assessment of areas populated with Risk Management Plan (RMP) sites and petrochemical facilities using the ASPECT system for detections of any airborne contaminants from ASPECT's 76 chemical detection library in the areas affected by Ida. The Region wanted to know if any detections were found, the location of the detection, and the concentration detected. Sites including Marathon Petroleum Company, Shell Norco Facility, and Phillips 66 pipeline site were surveyed. There were no chemical detections at the sites surveyed. Extremely slow satellite transmission speeds (possibly due to high bandwidth use by other first responders) resulted in long delays in data collection. Some chemical photos were pulled down during flight, with the majority needing to be pulled down with a more high-speed internet connection on the ground.

On 3 September 2021 ASPECT was tasked with a continuation of the general Baton Rouge area survey and conducted two flights. 8 locations in the Baton Rouge area were surveyed as part of two flights. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Flight 5 and 6 were conducted as part of survey operations conducted on 4 September 2021. Collectively, a total of 17 facilities were surveyed.

Table 1. Sites Covered on 03 September 2021 Flights 5 and 6

LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833
Westlake Vinyls Co LP	30.209167	-91.017222
Rubicon LLC - Geismar Facility	30.20139	-91.01222
BASF Corp - North Geismar Site	30.20594	-90.99195
BASF Corp - Geismar Site	30.18425	-91.002778
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188
CF INDUSTRIES	30.08328002	-90.957665
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275
NuStar Logistics LP - St James Terminal	30.030065	-90.843463

General Mission Objectives

Once granted access to fly over the sites, the following general mission objectives were employed in conducting data collection with ASPECT:

1. To capture an overall, situational awareness of the incident using aerial photography with:
    - Oblique camera—photos taken by hand from the view/position of the co-pilot, and
    - MSIC photos—advanced camera mounted underneath the plane for a top-down view of the designated sites.
2. To qualitatively locate and characterize any the visible and non-visible components of a plume, as well as any areas on fire:
    - Using the Infrared Line Scanner (IRLS)
3. To screen for the presence and location of specific chemicals within ASPECT's automated chemical detection library:
    - Using the Fourier Transform Infrared (FTIR) Spectrometer

Flight Conditions and Status

Weather and Site Conditions

Prior to each flight, an updated status of the current and forecasted weather, site conditions and any potential flight obstacles including radio towers impacting safety is assessed by the

crew. A summary of the ground weather conditions during the missions can be found in Table 2 and 3.

Table 2. Ground Weather for Baton Rouge, LA, Flight 5
4 September 2021

Time	953	1053	1153	1253	1353	1453
Wind direction	67.5 degrees ENE	112.5 degrees ESE	292.5 degrees WNW	315 degrees NW	0 degrees	0 degrees
Wind speed	1.3 m/s (3.0 mph)	2.2 m/s (5.0 mph)	2.2 m/s (5.0 mph)	2.2 m/s (5.0 mph)	2.7 m/s (6.0 mph)	1.3 m/s (3.0 mph)
Temperature	27.8 C	30.0 C	31.1 C	31.7 C	31.7 C	32.8 C
Relative humidity	74	70	66	61	61	56
Dew point	22.8 C	23.9 C	23.9 C	23.3 C	23.3 C	22.8 C
Pressure	1013.9 mb	1014.3 mb	1013.9 mb	1013.6 mb	1013.3 mb	1012.3 mb
Ceiling	Clear	Clear	Scattered 4200 Ft	Few 3900 Ft	Scattered 4200 Ft	Few 4600 Ft

Table 3. Ground Weather for Baton Rouge, LA, Flight 6
4 September 2021

Time	1653	1753	1853	1953
Wind direction	22.5 degrees NNE	45 degrees NE	45 degrees NE	67.5 degrees ENE
Wind speed	3.1 m/s (7.0 mph)	2.7 m/s (6.0 mph)	1.3 m/s (3.0 mph)	1.3 m/s (3.0 mph)
Temperature	32.2 C	31.7 C	29.4 C	26.7 C
Relative humidity	58	54	68	85
Dew point	22.8 C	21.1 C	22.8 C	23.9 C
Pressure	1011.2 mb	1011.2 mb	1011.2 mb	1011.6 mb
Ceiling	Broken 4900 Ft	Scattered 4900 Ft	Clear	Clear

Data Results

The following data is provided as a summary analysis. All data products are available for the Region to access on a shared FTP site. For a complete list of available products, see Appendix A. The data collected during these missions included a flight path summary, IRLS images, FTIR chemical identification and quantification, high resolution MSIC photos, and oblique photos.

Flight Paths

Wide, slow turns are required to be made in between runs to keep the instruments stable. The blue lines indicate the flight path while the green lines indicate the specific sections of the flight where chemical data was collected and processed. On Flight 1 the Baton Rouge area was surveyed, and the flight path is shown in Figure 1 and 2.

Figure 1. Data Collection Flight Path over the Baton Rouge Area Fight 5, 4 September 2021

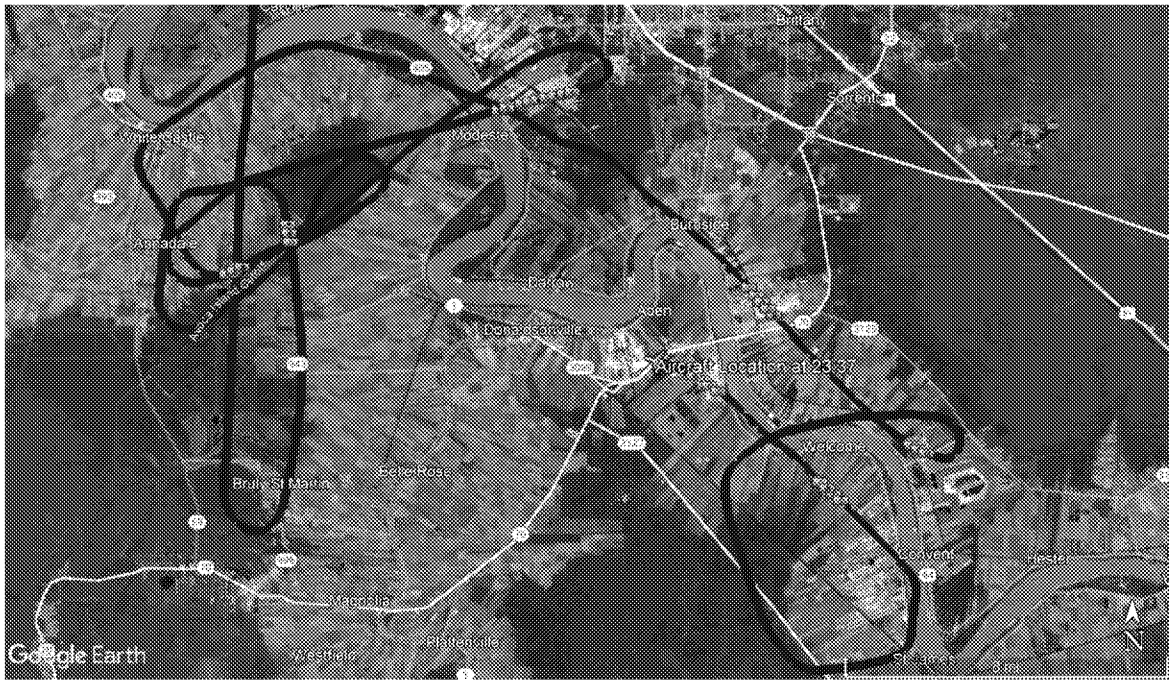

Figure 2. Data Collection Flight Path over the Baton Rouge Area Fight 6,

4 September 2021

Line Scanner Data Results

A total of 31 data collection runs were made over the target facilities and an infrared line scanner image was generated for each collection run. Figure 3 shows a 3-band infrared image collected over the CF Industries facility. Thermal analysis shows that many of the facilities are showing process units have some activity. The process unit located in the middle of figure 3 indicates hot units and hot piping. Other than thermal, no chemical plumes can be observed being emitted from the facility. Figure 4 shows a similar image collected on Flight 6 over the Occidental Chemical facility.

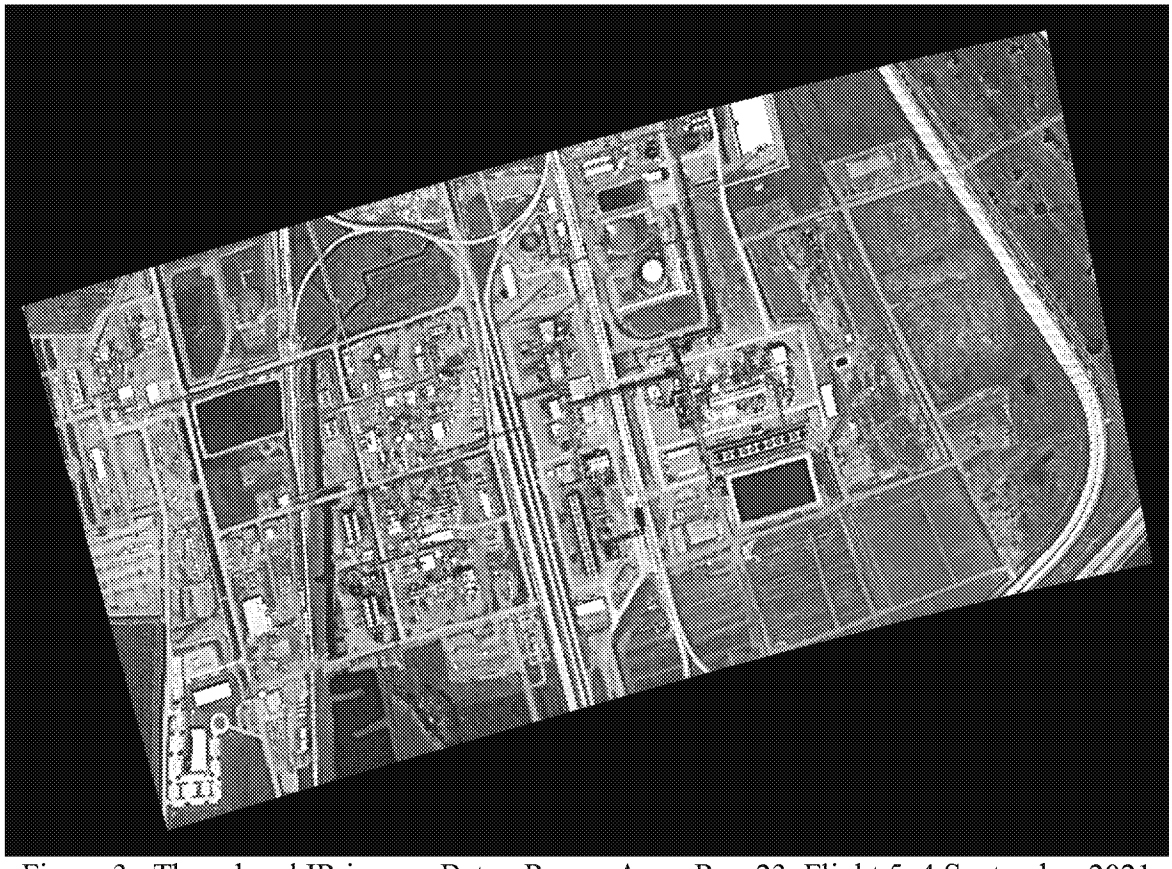

Figure 3. Three band IR image, Baton Rouge Area, Run 23, Flight 5, 4 September 2021

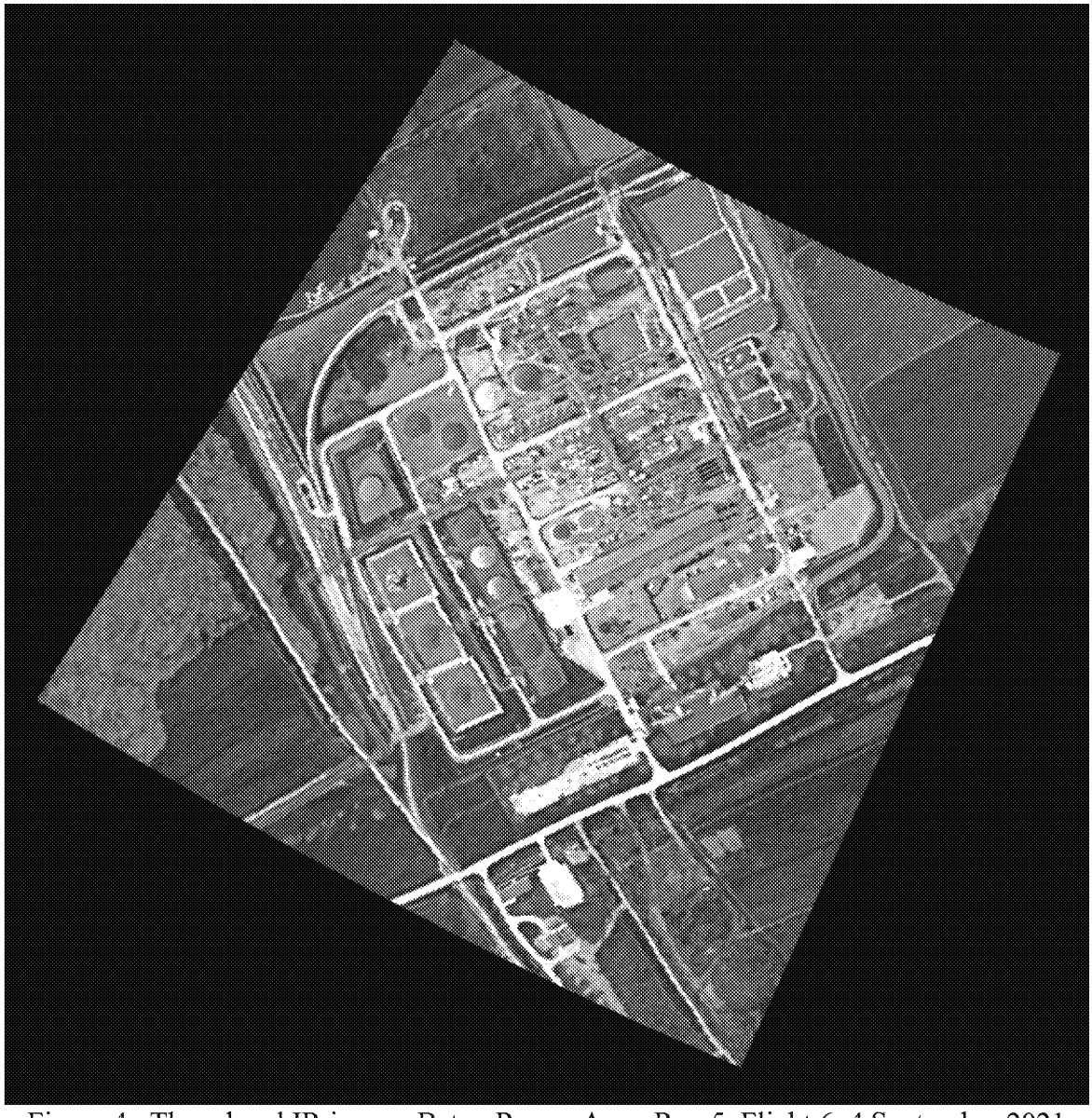

Figure 4. Three band IR image, Baton Rouge Area, Run 5, Flight 6, 4 September 2021

FTIR Data Results

FTIR spectral data at a resolution of 16 wavenumbers was collected for each run. ASPECT uses an automated detection algorithm to permit compounds to be automatically analyzed while the aircraft is in flight. Seventy-six chemical compounds are included in the airborne algorithm library (the list is provided in Appendix B, Table 1). In addition, collected data was also manually quality checked against a collection of published library spectra for each chemical detected.

ASTECT did not detect any programmed compounds (those found in Appendix B, Table 1) as part of the mission over the Baton Rouge areas on the two flights conducted on 3 September 2021. Details of the monitoring results can be found in Table 4 and 5.

Table 4. Chemical Results Summary
Baton Rouge Collection Area, Flight 5

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-04	14:13:50	Test	Test
2		15:01:22	ND	ND
3		15:12:15	ND	ND
4		15:24:47	ND	ND
5		15:32:46	ND	ND
6		15:42:23	ND	ND
7		15:51:20	ND	ND
8		16:02:17	ND	ND
9		16:09:39	ND	ND
10		16:18:48	ND	ND
11		16:27:35	ND	ND
12		16:35:25	ND	ND
13		16:45:24	ND	ND
14		16:52:56	ND	ND
15		17:07:25	ND	ND
16		17:18:42	ND	ND
17		17:28:17	ND	ND
18		17:34:43	ND	ND
19		17:49:52	ND	ND
20		17:56:26	ND	ND
21		18:08:41	ND	ND
22		18:15:49	ND	ND
23		18:21:56	ND	ND

Table 5. Chemical Results Summary
Baton Rouge Collection Area, Flight 6

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-04	22:50:57	ND	ND
2		22:54:08	ND	ND
3		23:05:33	ND	ND
4		23:22:35	ND	ND
5		23:25:21	ND	ND
6		23:34:31	ND	ND
7		23:36:23	ND	ND

Aerial Photography Results

A full set of high-resolution aerial digital photography were collected as part of each data collection pass. Weather conditions over the Baton Rouge allowed high quality aerial images to be collected. Figures 5 shows a representative aerial image collected over the Syngenta Crop Protection facility. Figure 6 shows a representative oblique with evidence of plant activity due to the steam plume.

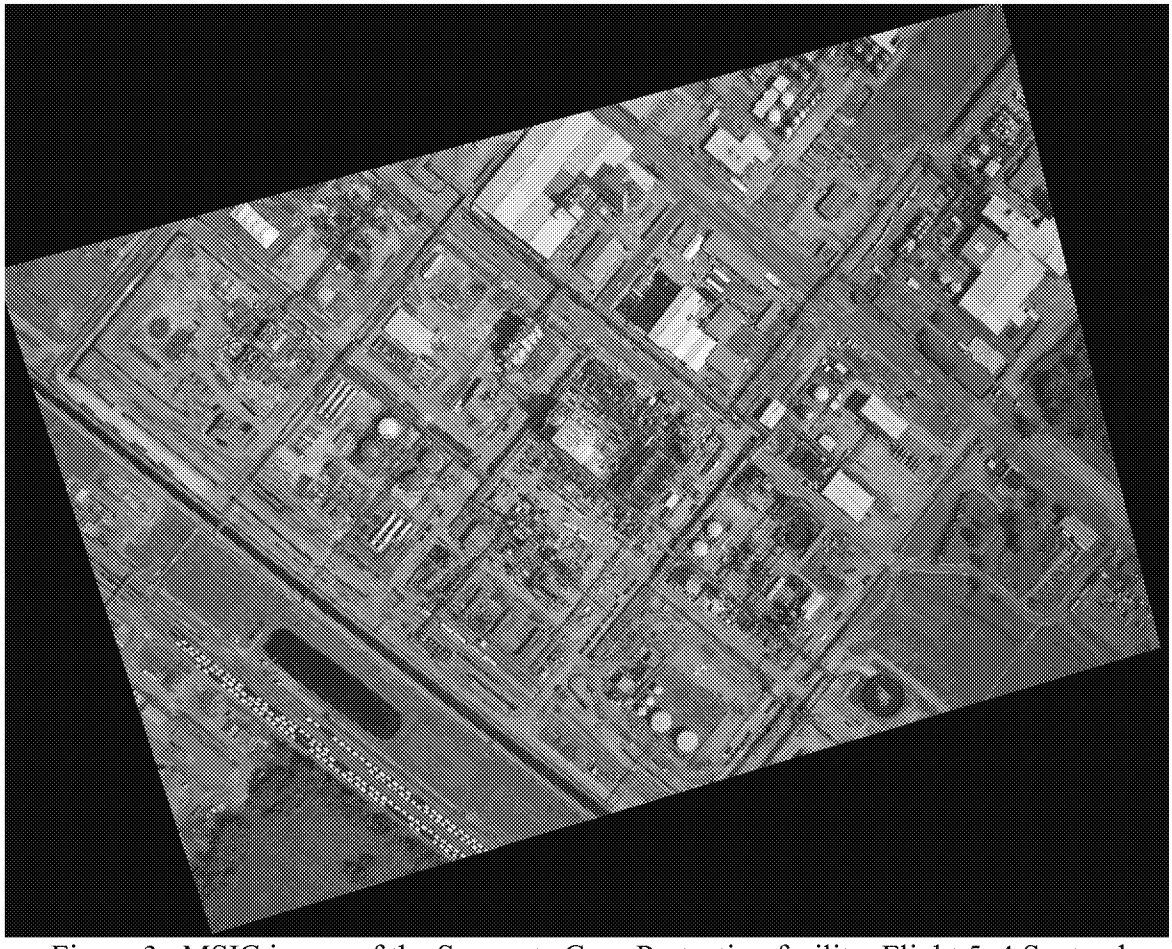

Figure 3. MSIC image of the Syngenta Crop Protection facility, Flight 5, 4 September 2021

Figure 6. Oblique photo taken over the TBD Facility as part of Flight 5, 4 September 2021

Conclusion

Two data collection flights were conducted on 4 September 2021 focusing on facilities south of Baton Rouge. A total of 29 active data collection passes were made covering 17 facilities. Analysis of IR imagery indicated that some facilities are showing hot process units. No chemical plumes or compounds being detected.

Appendix A: File Names of Data Collected During Flight

Baton Rouge Collection Areas, Flight 5, 4 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	14:13:50	5761	155	20210904141356969.jpg 20210904141403318.jpg 20210904141409674.jpg	20210904_141354_A.igm	2021_09_04_14_13_55_R_01 TA=20.6;TB=41.4;Gain=3	
2	15:01:22	2861	105	20210904150128661.jpg 20210904150135011.jpg 20210904150141375.jpg	20210904_150125_A.igm	2021_09_04_15_01_28_R_02 TA=22.5;TB=42.4;Gain=3	
3	15:12:15	2899	106	20210904151221430.jpg 20210904151227795.jpg 20210904151234138.jpg	20210904_151219_A.igm	2021_09_04_15_12_20_R_03 TA=24.9;TB=44.9;Gain=3	
4	15:24:47	2883	108	20210904152453167.jpg 20210904152459532.jpg 20210904152505881.jpg	20210904_152450_A.igm	2021_09_04_15_24_52_R_04 TA=25.0;TB=44.9;Gain=3	
5	15:32:46	2885	107	20210904153252537.jpg 20210904153258886.jpg 20210904153305250.jpg 20210904153312514.jpg	20210904_153249_A.igm	2021_09_04_15_32_52_R_05 TA=24.7;TB=44.9;Gain=3	
6	15:42:23	2904	105	20210904154229045.jpg 20210904154235410.jpg 20210904154241760.jpg 20210904154248110.jpg 20210904154254474.jpg 20210904154301728.jpg	20210904_154226_A.igm	2021_09_04_15_42_28_R_06 TA=26.1;TB=45.2;Gain=3	
7	15:51:20	2901	105	20210904155126521.jpg 20210904155132871.jpg 20210904155139231.jpg 20210904155145580.jpg 20210904155151945.jpg 20210904155158294.jpg	20210904_155123_A.igm	2021_09_04_15_51_25_R_07 TA=24.6;TB=44.7;Gain=3	
8	16:02:17	2891	110	20210904160222922.jpg 20210904160229287.jpg 20210904160235646.jpg 20210904160241995.jpg 20210904160249259.jpg	20210904_160220_A.igm	2021_09_04_16_02_22_R_08 TA=25.5;TB=45.4;Gain=3	
9	16:09:39	2926	105	20210904160945066.jpg 20210904160951431.jpg 20210904160958685.jpg 20210904161005049.jpg 20210904161011398.jpg 20210904161014122.jpg	20210904_160942_A.igm	2021_09_04_16_09_45_R_09 TA=26.2;TB=46.4;Gain=3	
10	16:18:48	2917	108	20210904161854355.jpg 20210904161900704.jpg 20210904161907054.jpg 20210904161913419.jpg 20210904161920673.jpg 20210904161927037.jpg	20210904_161851_A.igm	2021_09_04_16_18_54_R_10 TA=26.4;TB=46.4;Gain=3	
11	16:27:35	2931	107	20210904162741837.jpg 20210904162748186.jpg 20210904162754551.jpg 20210904162800900.jpg 20210904162807249.jpg 20210904162813614.jpg	20210904_162738_A.igm 20210904_162817_A.igm	2021_09_04_16_27_41_R_11 TA=26.3;TB=46.6;Gain=3	

				20210904162819963.jpg 20210904162826328.jpg			
12	16:35:25	2916	108	20210904163531214.jpg 20210904163537563.jpg 20210904163543928.jpg 20210904163551184.jpg 20210904163557549.jpg 20210904163603898.jpg 20210904163610263.jpg 20210904163616612.jpg	20210904_163528_A.igm 20210904_163608_A.igm	2021_09_04_16_35_31_R_12 TA=26.5;TB=46.6;Gain=3	
13	16:45:24	2914	114	20210904164531333.jpg 20210904164537688.jpg 20210904164544037.jpg	20210904_164527_A.igm	2021_09_04_16_45_30_R_13 TA=26.5;TB=46.6;Gain=3	
14	16:52:56	2877	109	20210904165302552.jpg 20210904165309821.jpg 20210904165316170.jpg 20210904165322535.jpg 20210904165328885.jpg	20210904_165300_A.igm	2021_09_04_16_53_02_R_14 TA=27.1;TB=47.3;Gain=3	
15	17:07:25	2888	107	20210904170731415.jpg 20210904170737764.jpg 20210904170744113.jpg 20210904170751383.jpg 20210904170757737.jpg 20210904170804102.jpg 20210904170810445.jpg 20210904170816810.jpg 20210904170823153.jpg 20210904170829518.jpg 20210904170835867.jpg 20210904170842232.jpg	20210904_170729_A.igm 20210904_170808_A.igm	2021_09_04_17_07_31_R_15 TA=26.7;TB=46.7;Gain=3	
16	17:18:42	2896	103	20210904171848705.jpg 20210904171855055.jpg 20210904171902324.jpg 20210904171908673.jpg 20210904171915023.jpg 20210904171921387.jpg 20210904171927737.jpg 20210904171934101.jpg 20210904171940451.jpg 20210904171946800.jpg 20210904171948625.jpg	20210904_171845_A.igm 20210904_171924_A.igm	2021_09_04_17_18_49_R_16 TA=32.7;TB=52.1;Gain=3	
17	17:28:17	2896	109	20210904172823395.jpg 20210904172829744.jpg 20210904172836109.jpg 20210904172842458.jpg 20210904172848823.jpg 20210904172856077.jpg 20210904172902442.jpg 20210904172908785.jpg	20210904_172820_A.igm 20210904_172859_A.igm	2021_09_04_17_28_23_R_17 TA=28.2;TB=48.3;Gain=3	
18	17:34:43	2872	100	20210904173449245.jpg 20210904173455610.jpg 20210904173501959.jpg 20210904173508324.jpg 20210904173514673.jpg 20210904173521943.jpg 20210904173528292.jpg 20210904173534651.jpg 20210904173541000.jpg	20210904_173446_A.igm 20210904_173525_A.igm	2021_09_04_17_34_49_R_18 TA=29.1;TB=49.0;Gain=3	
19	17:49:52	2912	124	20210904174958958.jpg 20210904175005323.jpg	20210904_174954_A.igm	2021_09_04_17_49_58_R_19 TA=31.1;TB=51.0;Gain=3	

				20210904175011672.jpg 20210904175018021.jpg			
20	17:56:26	2882	102	20210904175632080.jpg 20210904175638430.jpg 20210904175644794.jpg 20210904175651151.jpg 20210904175658405.jpg 20210904175704754.jpg 20210904175711119.jpg 20210904175717468.jpg 20210904175723832.jpg 20210904175730182.jpg	20210904_175629_A.igm 20210904_175709_A.igm	2021_09_04_17_56_32_R_20 TA=29.7;TB=49.6;Gain=3	
21	18:08:41	2901	99	20210904180847467.jpg 20210904180854731.jpg 20210904180901096.jpg 20210904180907445.jpg 20210904180913794.jpg 20210904180920159.jpg	20210904_180844_A.igm	2021_09_04_18_08_48_R_21 TA=28.3;TB=48.5;Gain=3	
22	18:15:49	2905	113	20210904181555083.jpg 20210904181601447.jpg 20210904181607797.jpg 20210904181614161.jpg 20210904181620511.jpg 20210904181627780.jpg	20210904_181551_A.igm	2021_09_04_18_15_55_R_22 TA=33.5;TB=53.6;Gain=3	
23	18:21:56	2896	114	20210904182201886.jpg 20210904182209140.jpg 20210904182215489.jpg 20210904182221854.jpg 20210904182228203.jpg 20210904182234568.jpg	20210904_182158_A.igm	2021_09_04_18_22_02_R_23 TA=33.4;TB=53.6;Gain=3	

Baton Rouge Collection Areas, Flight 6, 4 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	22:50:57	2910	109	20210904225102949.jpg 20210904225109314.jpg 20210904225115663.jpg	20210904_225100_A.igm	2021_09_04_22_51_01_R_01 TA=29.8;TB=50.5;Gain=3	
2	22:54:08	2934	102	20210904225413613.jpg 20210904225419962.jpg 20210904225426327.jpg	20210904_225411_A.igm	2021_09_04_22_54_12_R_02 TA=23.1;TB=43.9;Gain=3	
3	23:05:33	2920	101	20210904230539979.jpg 20210904230546344.jpg 20210904230552693.jpg 20210904230559042.jpg 20210904230605407.jpg 20210904230611757.jpg 20210904230618106.jpg 20210904230625375.jpg 20210904230631725.jpg 20210904230638089.jpg	20210904_230537_A.igm 20210904_230617_A.igm	2021_09_04_23_05_38_R_03 TA=23.0;TB=43.2;Gain=3	
4	23:22:35	2870	107	20210904232240461.jpg 20210904232247728.jpg 20210904232254077.jpg 20210904232300442.jpg 20210904232306791.jpg	20210904_232239_A.igm	2021_09_04_23_22_39_R_04 TA=24.3;TB=44.4;Gain=3	
5	23:25:21	2928	103	20210904232528425.jpg 20210904232534774.jpg 20210904232541139.jpg	20210904_232525_A.igm	2021_09_04_23_25_26_R_05 TA=24.3;TB=44.3;Gain=3	

6	23:34:31	3002	111	20210904233437701.jpg 20210904233444050.jpg 20210904233450402.jpg 20210904233456767.jpg	20210904_233434_A.igm	2021_09_04_23_34_35_R_06 TA=21.9;TB=41.8;Gain=3	
7	23:36:23	2878	109	20210904233628468.jpg 20210904233635722.jpg 20210904233642081.jpg 20210904233648430.jpg	20210904_233627_A.igm	2021_09_04_23_36_27_R_07 TA=21.9;TB=41.8;Gain=3	

Appendix B: Priority Sites Provided by EPA Region 6 & Louisiana Department of Environmental Quality

Facility_Name	Latitude	Longitude	Parish
Deltech LLC - Baton Rouge Facility	30.552892	-91.200536	East Baton Rouge
ExxonMobil Chemical Co - Baton Rouge Plastics Plant	30.551419	-91.175611	East Baton Rouge
ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644	East Baton Rouge
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Westlake Vinyls Co LP	30.209167	-91.017222	Ascension
Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219	East Baton Rouge
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586	Iberville
Rubicon LLC - Geismar Facility	30.20139	-91.01222	Ascension
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622	St. Charles
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145	Plaquemines
Axiall LLC - Plaquemine Facility	30.267167	-91.184258	Iberville
ExxonMobil Fuels & Lubricants Co - Baton Rouge Refinery	30.484392	-91.169444	East Baton Rouge
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387	East Baton Rouge
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884	Ascension
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles

BASF Corp - North Geismar Site	30.20594	-90.99195	Ascension
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333	Iberville
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist
Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472	St. John the Baptist
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508	Iberville
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333	Iberville
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631	Iberville
Targa Midstream Services LLC	29.237034	-89.384977	Plaquemines
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389	Iberville
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944	Terrebonne
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958	St. Charles
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833	Ascension
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278	Iberville
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833	Ascension
Dyno Nobel LA Ammonia LLC - Ammonia Production Facilty	29.964789	-90.264625	Jefferson
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792	Ascension
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles
CF INDUSTRIES	30.08328	-90.957665	Ascension

Appendix C: ASPECT Systems

The US EPA ASPECT system collects airborne infrared (IR) images and chemical screening data from a safe distance over the site (about 3,000 ft AGL). The system consists of an airborne high-speed Fourier Transform Infra-Red (FTIR) spectrometer coupled with a wide-area IR Line Scanner (IRLS). The ASPECT IR systems can detect chemical compounds in both the 8-to-12-micron (800 to 1200 cm-1) and 3 to 5 micron (2000 to 3200 cm-1) regions. List of chemicals and detection limits are listed in Table 1. The 8 to 12 micron region is typically known as the atmospheric window region since the band is reasonably void of water and carbon dioxide influence. Spectrally, this region is used to detect carbon - non-carbon bonded compounds. The 3 to 5 micron region is also free of water and carbon dioxide but typically does not have sufficient energy for use. This band does show use in high-energy environments such as fires. The carbon - hydrogen stretch is very common in this region.

An Imperx mapping camera (29 mega pixels; mapping focal plane array) is concurrently operated as part of all chemical collections. These images are often digitally processed in lower resolution, so they can be transmitted via satellite communication. All imagery is geo-rectified using both aircraft attitude correction (pitch, yaw, and roll) and GPS positional information. Imagery can be processed while in flight or approximately 600 frames per hour can be processed once the data are downloaded from the aircraft. The high-resolution images (>20 MB each) are pulled from the ASPECT after the sortie and are available later.

All aerial photographic images collected by the ASPECT system are ortho-rectified and geospatially validated by the scientific reach back team. In general, this consists of conducting geo-registration using a USGS Digital Elevation Model (DEM) which promotes superior pixel computation and lessens topographic distortion. The image is check by the team (using a Google Earth base map) for proper location and rotation.

Airborne radiological measurements are conducted using three fully integrated multi-crystal sodium iodide (NaI) RSX4 gamma ray spectrometers. Each RSX4 spectrometer contains four 4"x2"x16" doped NaI crystals each having an independent photomultiplier/ spectrometer assembly. One RSX unit is configured with an additional upward NaI crystal utilized to provide real-time cosmic ray correction. Count and energy data from each crystal and pack is combined using a self-calibrating signal processor to generate a virtual detector output. All radiological spectrometer "packs" are further combined using a signal console controlled by the on-board central computer in the aircraft. Altitude correction data is provided by a radar altimeter with internal GPS systems within the packs serving as a backup. It should be noted that no radiological measurements were conducted on this mission.

Data is processed using automated algorithms onboard the aircraft with preliminary results being sent using a satellite system to the ASPECT scientific reach back team for QA/QC analysis. Upon landing, preliminary data results are examined and validated by the

scientific reach back team.

Table 1. ASPECT Automated Compounds

This table contains ASPECT's library of automated compounds.
Detection limits are for each chemical is found in parenthesis in units of parts per million (ppm)

Acetic Acid (2.0)	Cumene (23.1)	Isoprene (6.5)	Phosphine (8.3)
Acetone (5.6)	Diborane (5.0)	Isopropanol (8.5)	Phosphorus Oxychloride (2.0)
Acrolein (8.8)	1,1-Dichloroethene (3.7)	Isopropyl Acetate (0.7)	Propyl Acetate (0.7)
Acrylonitrile (12.5)	Dichloromethane (6.0)	MAPP (3.7)	Propylene (3.7)
Acrylic Acid (3.3)	Dichlorodifluoromethane (0.7)	Methyl Acetate (1.0)	Propylene Oxide (6.8)
Allyl Alcohol (5.3)	1,1-Difluoroethane (0.8)	Methyl Acrylate (1.0)	Silicon Tetrafluoride (0.2)
Ammonia (2.0)	Difluoromethane (0.8)	Methyl Ethyl Ketone (7.5)	Sulfur Dioxide (15)
Arsine (18.7)	Ethanol (6.3)	Methanol (5.4)	Sulfur Hexafluoride (0.07)
Bis-Chloroethyl Ether (1.7)	Ethyl Acetate (0.8)	Methylbromide (60)	Sulfur Mustard (6.0)
Boron Tribromide (0.2)	Ethyl Acrylate (0.8)	Methylene Chloride (1.1)	Sulfuryl Fluoride (1.5)
Boron Triflouride (5.6)	Ethyl Formate (1.0)	Methyl Methacrylate (3.0)	Tetrachloroethylene (10)
1,3-Butadiene (5.0)	Ethylene (5.0)	MTEB (3.8)	1,1,1-Trichloroethane (1.9)
1-Butene (12.0)	Formic Acid (5.0)	Naphthalene (3.8)	Trichloroethylene (2.7)
2-Butene (18.8)	Freon 134a (0.8)	n-Butyl Acetate (3.8)	Trichloromethane (0.7)
Carbon Tetrachloride (0.2)	GA (Tabun) (0.7)	n-Butyl Alcohol (7.9)	Triethylamine (6.2)
Carbonyl Fluoride (0.8)	GB (Sarin) (0.5)	Nitric Acid (5.0)	Triethylphosphate (0.3)
Carbon Tetraflouride (0.1)	Germane (1.5)	Nitrogen Mustard (2.5)	Trimethylamine (9.3)
Chlorodifluoromethane (0.6)	Hexafluoroacetone (0.4)	Nitrogen Trifluoride (0.7)	Trimethyl Phosphite (0.4)
Chloromethane (12)	Isobutylene (15)	Phosgene (0.5)	Vinyl Acetate (0.6)

Message

From: Honnellio, Anthony [Honnellio.Anthony@epa.gov]
Sent: 9/2/2021 2:08:36 PM
To: Argenta, Edward [Argenta.Edward@epa.gov]; Taylor, Jillianne [Taylor.Jillianne@epa.gov]
Subject: FW: EPA ASPECT Opening Up Lines of Communication

I just got off the phone with LT Herr from USCG Area Command who confirmed that he is the right POC. I let him know that we are conducting test flights today and are awaiting a MA. In addition, he is sending a list of priority targets our way FYI. They have 22 confirmed damaged facilities, with over 100 yet to assess, and are very interested in our chem detection capabilities.

Tony Honnellio
Health Physicist
EPA ASPECT (Detail)
5 Post Office Square, Suite 100
Boston, MA 02109-3912
W: 617 918-1456
C: 617 947-4414
F: 617 918-0456

From: Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) <Kevin.N.Herr@uscg.mil>
Sent: Thursday, September 2, 2021 9:59 AM
To: Honnellio, Anthony <Honnellio.Anthony@epa.gov>
Subject: RE: EPA ASPECT Opening Up Lines of Communication

Sir,

I am checking with our IC right now. I intend to send you our highest priority targets in case you are able to image. It will be in your inbox momentarily.

VR
LT Kevin Herr
RFI/CRM/COM/ISR Manager
Area Command

O: 314-269-2642
C: 813-217-3418

From: Honnellio, Anthony <Honnellio.Anthony@epa.gov>
Sent: Thursday, September 2, 2021 9:45 AM
To: Richmond, Patrick L CWO-3 USCG HQS (USA) <Patrick.L.Richmond@uscg.mil>; D05-DG-M-MIFCLANT-GEOINT <D05-DG-M-MIFCLANT-GEOINT@uscg.mil>
Cc: Argenta, Edward <Argenta.Edward@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; MunizTirado, Ernesto CDR USCG MIFC LANT (USA) <Ernesto.Muniz@uscg.mil>; Leclaire, Matthew J CIV USCG MIFC LANT (USA) <Matthew.J.Leclaire@uscg.mil>; Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) <Kevin.N.Herr@uscg.mil>
Subject: [Non-DoD Source] RE: EPA ASPECT Opening Up Lines of Communication

Thank you for your timely response Chief Warrant Officer Richmond,

The ASPECT Team is looking forward to the opportunity to collaborate and can grant permission for the current mission's data to reside on your stormsite. That may change depending on our customer, but likely would not be an issue in the future then either. We have our pre-flight safety briefing in ~1 hour and wheels up shortly thereafter. I'll be reaching out to LT Herr (with a cc to MIFCLANT) shortly. Thank you again for your assistance, and please let me know if you have any questions.

Very Respectfully,

Tony Honnellio
Health Physicist
EPA ASPECT (Detail)
5 Post Office Square, Suite 100
Boston, MA 02109-3912
W: 617 918-1456
C: 617 947-4414
F: 617 918-0456

From: Richmond, Patrick L CWO-3 USCG HQS (USA) <Patrick.L.Richmond@uscg.mil>
Sent: Thursday, September 2, 2021 9:26 AM
To: Honnellio, Anthony <Honnellio.Anthony@epa.gov>; D05-DG-M-MIFCLANT-GEOINT <D05-DG-M-MIFCLANT-GEOINT@uscg.mil>
Cc: Argenta, Edward <Argenta.Edward@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; MunizTirado, Ernesto CDR USCG MIFC LANT (USA) <Ernesto.Muniz@uscg.mil>; Leclaire, Matthew J CIV USCG MIFC LANT (USA) <Matthew.J.Leclaire@uscg.mil>; Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) <Kevin.N.Herr@uscg.mil>
Subject: RE: EPA ASPECT Opening Up Lines of Communication

Mr. Honnelio,

LT Kevin Herr (CC`d) is running the ISR Collections for Hurricane Ida response. I believe he is the best POC for coordination of flights and coordination for dissemination of data to the appropriate preventions teams.

If able, our team would like to also been copied on any dissemination to the above MIFCLANT Distro email. Also would like permission to hang any products on our stormsite for larger distribution to interested customers. Let me know if that will be an issue

Regards,

CWO3 Patrick L. Richmond
Maritime Intelligence Fusion Center, Atlantic
W: 757-492-4474
C: 508-564-2979

Warning: This document is FOR OFFICIAL USE ONLY (FOUO). It contains information that may be exempt from public release under the Freedom of Information Act (5 U.S.C. 552). It is to be controlled, stored, handled, transmitted, distributed, and disposed of in accordance with DHS policy relating to FOUO information and is not to be released to the public or other personnel who do not have a valid "need-to-know" without prior approval.

From: Honnellio, Anthony <Honnellio.Anthony@epa.gov>
Sent: Thursday, September 2, 2021 9:12 AM
To: Richmond, Patrick L CWO-3 USCG HQS (USA) <Patrick.L.Richmond@uscg.mil>; D05-DG-M-MIFCLANT-GEOINT <D05-DG-M-MIFCLANT-GEOINT@uscg.mil>
Cc: Argenta, Edward <Argenta.Edward@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Subject: [Non-DoD Source] EPA ASPECT Opening Up Lines of Communication

Good Day,

The U.S. Environmental Protection Agency's (EPA) Airborne Spectrographic Photometric Environmental Collection Technology (ASPECT - https://www.epa.gov/emergency-response/aspect) airplane is anticipating a Mission Assignment (MA) to fly in LA. ASPECT provides the capability to provide near real-time screening data for chemical and radiological hazards as well as NADIR/Oblique photometric data. We will be running test flights this morning, and would like to initiate data sharing with USGS HDDS with the assistance USCG District 5/Maritime Intelligence Fusion Center-Atlantic (MIFCLANT) GEOINT team. Any guidance you may be able to provide such that we can start providing data to the right folks while ASPECT is wheels up would be appreciated. Data sets include near real time XML of our flights with initial low resolution data images. ASPECT will also conduct scanning with our chemical sensors and taking Nadir and oblique (as identified by the pilots) photos. Please let me know if you have any questions.

Very Respectfully,

Tony Honnellio
Health Physicist
EPA ASPECT (Detail)
5 Post Office Square, Suite 100
Boston, MA 02109-3912
W: 617 918-1456
C: 617 947-4414
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Message

From: Rick Turville [rick@spectralsystemsglobal.com]
Sent: 9/9/2021 1:43:35 AM
To: Taylor, Jillianne [Taylor.Jillianne@epa.gov]; jill.rene.taylor [jill.rene.taylor@gmail.com]; mark [mark@spectralsystemsglobal.com]
Subject: Draft ASPECT report for 8 September 2021
Attachments: ASPECT Summary - Hurricane Ida 8 September 2021.docx

Jill,
Please find attached the draft ASPECT report for 8 September 2021. Please let us know if you have any questions.

R/Rick

Airborne
Spectral
Photometric
Environmental
Collection
Technology

ASPECT Air Quality Survey
Baton Rouge, LA.
September 8, 2021

ASPECT Mission Supporting:
Eric Delgado
On-Scene Coordinator
Delgado.Eric@epa.gov

Initial Mission Request
Brian Fontenot
Louisiana Department of Environmental Quality

ASPECT TEAM

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Ed Argenta
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202-843-4511

ED_006338_00001239-00001

Table of Contents

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Acronyms and Abbreviations

Alt	Altitude (in feet)
AGL	Above Ground Level
cm	centimeter
CDT	Central Daylight Time
DEM	Digital Elevation Model
ESF-10	Emergency Support Function #10 – Oil and Hazardous Materials Response
FEMA	Federal Emergency Management Agency
ft	feet
FTIR	Fourier Transform Infrared Spectrometer
FTP	File Transfer Protocol
igm	Spectral data format based on grams format
IR	Infrared
IRLS	Infrared Line Scanner
jpg	JPEG image format
kts	knots
mph	miles per hour
m/s	meters per second
MSIC	Digital photography file from the Imperx mapping camera
MSL	Mean Sea Level Altitude (in feet)
PAN	peroxyacetyl nitrate
Ppm	parts per million
RMP	Risk Management Plan

UTC	Universal Time Coordinated

Executive Summary

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 30 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2nd, 2021, the State of Louisiana requested ESF-10 assistance through FEMA and Region 6 asked for the ASPECT plane to be deployed in support of the response to Hurricane Ida. The state wanted assistance monitoring facility emissions in the industrial area between Baton Rouge and New Orleans, where flaring is resulting in the visible emission of black smoke.

ASPECT was tasked to perform remote chemical sensing over target properties to screen for airborne chemicals and take high-resolution photos to provide situational awareness. Potential areas identified for monitoring included: East Baton Rouge, Ascension, Iberville, St. James, St. John, St. Charles, Jefferson, and Orleans. The system conducted one flight mission on 2 September 2021 including air monitoring survey collections over the target area with favorable weather conditions for all passes. Although two black plumes were visible over one of the sites, no major emissions were detected with the FTIR.

A continuation of the overall Baton Rouge facility survey was conducted on 3 September 2021. Two data collection flights were conducted which bracketed a Presidential temporary flight restriction not allowing any flight activity. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Flight 5 and 6 were conducted as part of survey operations conducted on 4 September 2021. A total of 17 facilities were surveyed. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm in addition to ozone and peroxyacetyl nitrate. Analysis of IR imagery indicated that some facilities are showing hot process units.

ASPECT conducted two data collection missions on 5 September 2021 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Two data collection missions were conducted by ASPECT on 7 September 2021 with the primary focus to collect additional data over target surveyed on 5 September 2021 (St.

Bernard, Terrebonne, St. Charles, and St. James areas). A total of 16 data collection passes (2 test and 14 active) were made over about half of the target list. Weather conditions complicated the mission with numerous convective cells and low clouds in the area. No compounds were detected on either flight. conducted two data collection missions on 5 September 2021 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas.

ASPECT conducted two missions on 8 September 2021 with the primary objective to complete the mission of collecting additional data at facilities assigned on 7 September. Weather conditions over the target areas within St. Bernard, Terrebonne, St. Charles, and St. James parishes was marginal due to clouds and convective activity. A total of 21 data collection passes (2 test and 19 active) were required to complete the mission with no detections observed.

ASPECT Air Quality Survey
Hurricane IDA
Baton Rouge, LA
September 8, 2021

Background and Operational Overview

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 30 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On 2 September 2021, ASPECT was tasked to conduct a wide area air quality screening level assessment of areas populated with Risk Management Plan (RMP) sites and petrochemical facilities using the ASPECT system for detections of any airborne contaminants from ASPECT's 76 chemical detection library in the areas affected by Ida. The Region wanted to know if any detections were found, the location of the detection, and the concentration detected. Sites including Marathon Petroleum Company, Shell Norco Facility, and Phillips 66 pipeline site were surveyed. There were no chemical detections at the sites surveyed. Extremely slow satellite transmission speeds (possibly due to high bandwidth use by other first responders) resulted in long delays in data collection. Some chemical photos were pulled down during flight, with the majority needing to be pulled down with a more high-speed internet connection on the ground.

On 3 September 2021 ASPECT was tasked with a continuation of the general Baton Rouge area survey and conducted two flights. 8 locations in the Baton Rouge area were surveyed as part of two flights. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Two data collection flights were conducted on 4 September 2021 focusing on facilities south of Baton Rouge. A total of 29 active data collection passes were made covering 17 facilities. Analysis of IR imagery indicated that some facilities are showing hot process units. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm.

ASPECT conducted two data collection missions on 5 September 2021 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within

impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Due to poor weather, ASPECT did not conduct any flight activities on 6 September 2021. ASPECT was tasked with two missions on 7 September consisting largely of revisiting facilities surveyed on 6 September 2021 for the purpose of collecting additional data.

ASPECT was tasked with two missions on 8 September 2021 for the purpose of collecting additional data for those facilities and sites surveyed on 5 September. This report details the significant findings of these two survey missions.

Table 1. Sites Covered on 7 and 8 September 2021

Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Dyno Nobel LA Ammonia LLC - Ammonia Production Facility	29.964789	-90.264625	Jefferson
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles

General Mission Objectives

Once granted access to fly over the sites, the following general mission objectives were employed in conducting data collection with ASPECT:

1. To capture an overall, situational awareness of the incident using aerial photography with:
    - Oblique camera—photos taken by hand from the view/position of the co-pilot, and
    - MSIC photos—advanced camera mounted underneath the plane for a top-down view of the designated sites.

2. To qualitatively locate and characterize any the visible and non-visible components of a plume, as well as any areas on fire:
    - Using the Infrared Line Scanner (IRLS)
3. To screen for the presence and location of specific chemicals within ASPECT's automated chemical detection library:
    - Using the Fourier Transform Infrared (FTIR) Spectrometer

Flight Conditions and Status

Weather and Site Conditions

Prior to each flight, an updated status of the current and forecasted weather, site conditions and any potential flight obstacles including radio towers impacting safety is assessed by the crew. A summary of the ground weather conditions during the missions can be found in Table 2 and 3.

Table 2. Ground Weather for Baton Rouge, LA, Flight 11
8 September 2021

Time	753	853	953	1053
Wind direction	0 degrees N	0 degrees N	22.5 degrees NNE	0 degrees N
Wind speed	0.4 m/s (1.0 mph)	0.4 m/s (1.0 mph)	2.2 m/s (5.0 mph)	0.4 m/s (1.0 mph)
Temperature	22.8 C	23.9 C	26.1 C	27.8 C
Relative humidity	100	96	88	77
Dew point	22.8 C	23.3 C	23.9 C	23.3 C
Pressure	1011.2 mb	1011.6 mb	1012.6 mb	1012.3 mb
Ceiling	Clear	Clear	Clear	Few 1700 Ft

Table 3. Ground Weather for Baton Rouge, LA, Flight 12
8 September 2021

Time	1253	1353	1453	1553	1653
Wind direction	0 degrees	0 degrees	292.5 degrees WNW	0 degrees	0 degrees N
Wind speed	1.3 m/s (3.0 mph)	1.3 m/s (3.0 mph)	2.7 m/s (6.0 mph)	2.7 m/s (6.0 mph)	3.1 m/s (7.0 mph)
Temperature	30.6 C	31.1 C	30.6 C	30.6 C	30.0 C
Relative humidity	63	66	65	65	67
Dew point	22.8 C	23.9 C	23.3 C	23.3 C	23.3 C
Pressure	1011.2 mb	1010.9 mb	1009.9 mb	1009.5 mb	1009.5 mb
Ceiling	Few 2800 Ft	Scattered 4100 Ft	Broken 3500 Ft	Scattered 3600 Ft	Scattered 3100 Ft

Data Results

The following data is provided as a summary analysis. All data products are available for the Region to access on a shared FTP site. For a complete list of available products, see Appendix A. The data collected during these missions included a flight path summary, IRLS images, FTIR chemical identification and quantification, high resolution MSIC photos, and oblique photos.

Flight Paths

Wide, slow turns are required to be made in between runs to keep the instruments stable. The blue lines indicate the flight path while the green lines indicate the specific sections of the flight where chemical data was collected and processed. On Flight 1 the St. Bernard, Terrebonne, St. Charles, and St. James area was surveyed, and the flight path is shown in Figure 1 and 2.

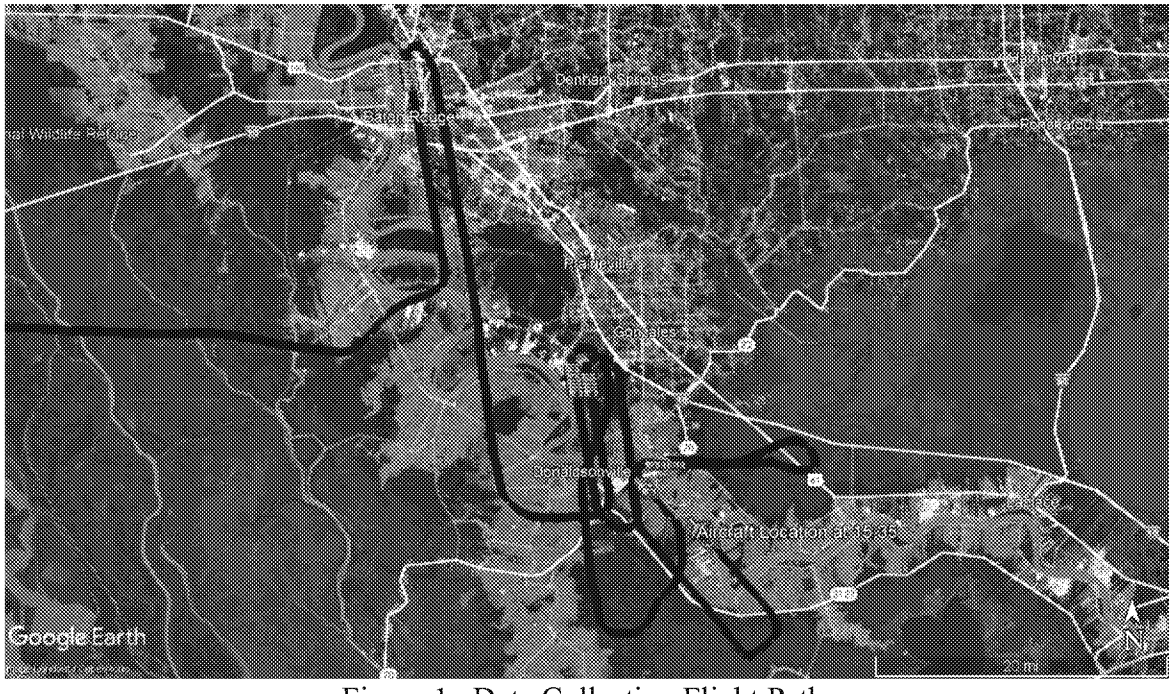

Figure 1. Data Collection Flight Path,
St. Bernard, Terrebonne, St. Charles, and St. James, Fight 11,
8 September 2021

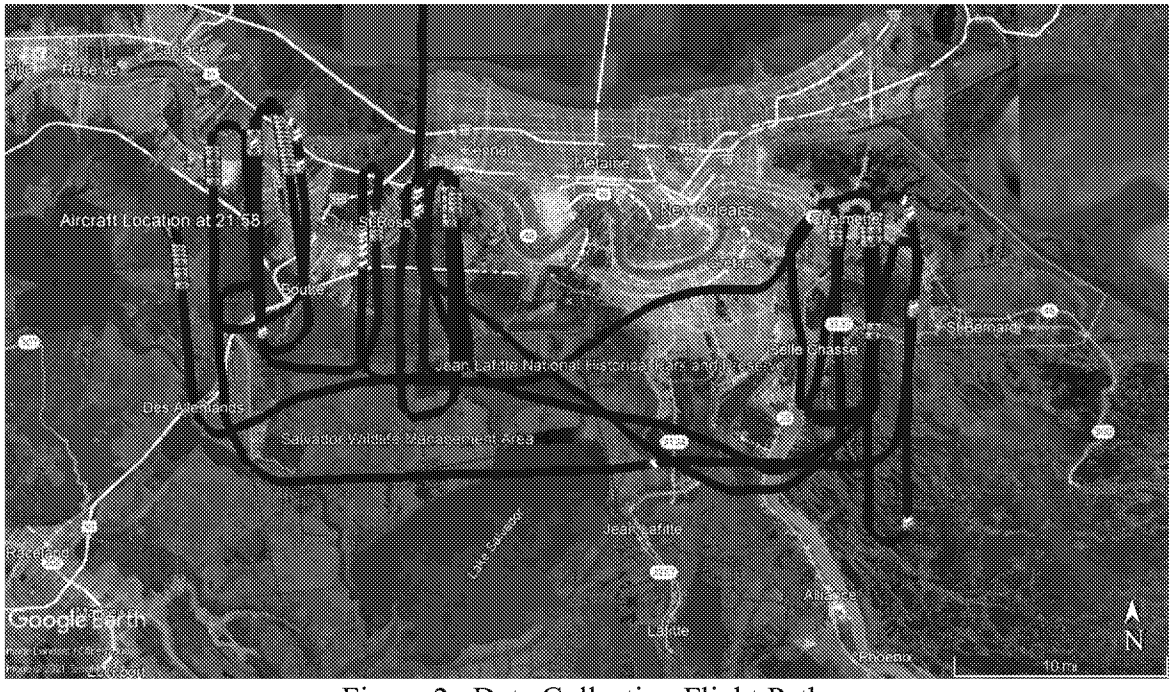

Figure 2. Data Collection Flight Path,
St. Bernard, Terrebonne, St. Charles, and St. James, Fight 12,
8 September 2021

Line Scanner Data Results

A total of 21 data collection runs (2 tests and 19 active) were made over the target facilities and an infrared line scanner image was generated for each collection run. Figure 4 shows a 3-band infrared image collected over the Shell Convent refinery. Analysis of the image shows elevated piping and hot units in the main process section of the facility. No discharges can be seen leaving the facility. Figure 5 shows a similar image collected over the Valero Refining Meraux Refinery. Hot flares in the lower portion of the image in addition to some hot process piping is evident.

Figure 4. Three band IR image, Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery , Flight 11, 8 September 2021

Figure 5. Three band IR image, Valero Refining - Meraux LLC - Meraux Refinery, Flight 12, 8 September 2021

FTIR Data Results

FTIR spectral data at a resolution of 16 wavenumbers was collected for each run. ASPECT uses an automated detection algorithm to permit compounds to be automatically analyzed while the aircraft is in flight. Seventy-six chemical compounds are included in the airborne algorithm library (the list is provided in Appendix B, Table 1). In addition, collected data was also manually quality checked against a collection of published library spectra for each chemical detected.

ASTECT did not detect any programmed compounds (those found in Appendix B, Table 1) as part of the mission over the target areas on the two flights conducted on 8 September 2021. Details of the monitoring results can be found in Table 4 and 5.

Table 4. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 11

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-08	13:33:30	Test	Test
2		14:17:52	ND	ND
3		14:40:19	ND	ND
4		14:52:31	ND	ND
5		15:09:37	ND	ND
6		15:21:28	ND	ND
7		15:34:50	ND	ND

Table 5. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 12

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-08	18:34:18	Test	Test
2		19:01:56	ND	ND
3		19:15:34	ND	ND
4		19:44:16	ND	ND
5		19:55:29	ND	ND
6		20:07:03	ND	ND
7		20:19:49	ND	ND
8		20:32:08	ND	ND
9		20:42:11	ND	ND
10		20:54:08	ND	ND
11		21:13:18	ND	ND
12		21:24:24	ND	ND
13		21:35:33	ND	ND
14		21:56:30	ND	ND

Aerial Photography Results

A full set of high-resolution aerial digital photography were collected as part of each data collection pass. As with the missions on 7 September 2021, flight conditions were complicated by low ceiling and convective activity. An aerial image of the St. Rose refinery is given in figures 6. No significant damage or activity is evident in the image. An oblique image of the Valero Meraux Refinery is shown in figure 7. As indicated in IR images of the same facility, two flares can be observed indicating some activity within the facility.

Figure 6. MSIC image of the St Rose Refinery LLC - St Rose, Flight 12, 8 September 2021

Figure 7. Oblique photo of the Valero Meraux Refinery. Flight 12, 8 September 2021

Conclusion

ASPECT conducted two missions on 8 September 2021 with the primary objective to complete the mission of collecting additional data at facilities assigned on 7 September. Weather conditions over the target areas within St. Bernard, Terrebonne, St. Charles, and St. James parishes was marginal due to clouds and convective activity. A total of 21 data collection passes (2 test and 19 active) were required to complete the mission with no detections observed.

Appendix A: File Names of Data Collected During Flight

St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 11, 8 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	13:33:30	3592	152	20210908133336255.jpg 20210908133342604.jpg 20210908133348968.jpg 20210908133350778.jpg	20210908_133333_A.igm	2021_09_08_13_33_34_R_01 TA=22.8;TB=43.6;Gain=3	
2	14:17:52	2868	106	20210908141759050.jpg 20210908141805409.jpg 20210908141811758.jpg 20210908141818122.jpg 20210908141824471.jpg 20210908141830826.jpg 20210908141837175.jpg 20210908141843533.jpg	20210908_141755_A.igm 20210908_141835_A.igm	2021_09_08_14_17_57_R_02 TA=18.0;TB=38.0;Gain=3	
3	14:40:19	2885	107	20210908144025438.jpg 20210908144031788.jpg 20210908144038152.jpg 20210908144044501.jpg 20210908144050860.jpg 20210908144057209.jpg	20210908_144022_A.igm	2021_09_08_14_40_24_R_03 TA=20.9;TB=41.0;Gain=3	
4	14:52:31	2887	107	20210908145237194.jpg 20210908145244464.jpg 20210908145250811.jpg 20210908145257176.jpg 20210908145303525.jpg 20210908145309874.jpg 20210908145316233.jpg 20210908145322582.jpg 20210908145328947.jpg	20210908_145235_A.igm 20210908_145314_A.igm	2021_09_08_14_52_36_R_04 TA=22.7;TB=42.6;Gain=3	
5	15:09:37	2946	103	20210908150943111.jpg 20210908150949454.jpg 20210908150955818.jpg 20210908151002170.jpg 20210908151008519.jpg 20210908151014883.jpg	20210908_150939_A.igm	2021_09_08_15_09_41_R_05 TA=23.9;TB=43.9;Gain=3	
6	15:21:28	2875	106	20210908152133983.jpg 20210908152140335.jpg 20210908152146684.jpg 20210908152153041.jpg 20210908152159406.jpg 20210908152205749.jpg 20210908152212114.jpg 20210908152219367.jpg 20210908152225732.jpg	20210908_152130_A.igm 20210908_152210_A.igm	2021_09_08_15_21_32_R_06 TA=23.2;TB=43.3;Gain=3	
7	15:34:50	2914	106	20210908153456558.jpg 20210908153502907.jpg 20210908153509271.jpg 20210908153515620.jpg 20210908153521979.jpg	20210908_153453_A.igm	2021_09_08_15_34_55_R_07 TA=22.4;TB=42.5;Gain=3	

St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 12, 8 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	18:34:18	2559	130	20210908183424447.jpg 20210908183429907.jpg 20210908183435351.jpg	20210908_183421_A.igm	2021_09_08_18_34_22_R_01 TA=26.6;TB=46.8;Gain=3	
2	19:01:56	2560	107	20210908190202275.jpg 20210908190208624.jpg 20210908190214974.jpg 20210908190221338.jpg 20210908190227688.jpg	20210908_190200_A.igm	2021_09_08_19_02_00_R_02 TA=22.9;TB=43.0;Gain=3	
3	19:15:34	2545	100	20210908191540278.jpg 20210908191546643.jpg 20210908191552992.jpg	20210908_191537_A.igm	2021_09_08_19_15_38_R_03 TA=24.6;TB=44.5;Gain=3	
4	19:44:16	2545	106	20210908194422556.jpg 20210908194428908.jpg 20210908194436178.jpg 20210908194442527.jpg 20210908194448892.jpg	20210908_194420_A.igm	2021_09_08_19_44_21_R_04 TA=22.9;TB=42.8;Gain=3	
5	19:55:29	2538	105	20210908195535298.jpg 20210908195541663.jpg 20210908195548012.jpg 20210908195554377.jpg 20210908195600726.jpg 20210908195607080.jpg 20210908195613430.jpg 20210908195619799.jpg	20210908_195532_A.igm 20210908_195611_A.igm	2021_09_08_19_55_33_R_05 TA=26.8;TB=46.6;Gain=3	
6	20:07:03	2531	107	20210908200708943.jpg 20210908200715292.jpg 20210908200721641.jpg 20210908200728911.jpg 20210908200735260.jpg 20210908200741625.jpg 20210908200747974.jpg 20210908200754339.jpg 20210908200800688.jpg 20210908200807942.jpg 20210908200814307.jpg 20210908200820656.jpg	20210908_200707_A.igm 20210908_200745_A.igm 20210908_200759_A.igm	2021_09_08_20_07_07_R_06 TA=24.4;TB=44.1;Gain=3 2021_09_08_20_08_00_R_07 TA=24.3;TB=44.3;Gain=3	
7	20:19:49	2523	104	20210908201956101.jpg 20210908202002466.jpg 20210908202008815.jpg 20210908202015180.jpg 20210908202021529.jpg 20210908202027878.jpg	20210908_201953_A.igm	2021_09_08_20_19_54_R_08 TA=27.6;TB=47.6;Gain=3	
8	20:32:08	2533	108	20210908203214224.jpg 20210908203220573.jpg 20210908203226938.jpg 20210908203233287.jpg	20210908_203211_A.igm	2021_09_08_20_32_13_R_09 TA=26.9;TB=46.9;Gain=3	
9	20:42:11	2545	104	20210908204217063.jpg 20210908204223428.jpg 20210908204229782.jpg 20210908204237036.jpg 20210908204243396.jpg 20210908204244301.jpg	20210908_204215_A.igm	2021_09_08_20_42_16_R_10 TA=27.2;TB=47.3;Gain=3	

10	20:54:08	2547	106	20210908205414302.jpg 20210908205421558.jpg 20210908205427923.jpg 20210908205434282.jpg 20210908205440631.jpg 20210908205446980.jpg 20210908205453345.jpg 20210908205459694.jpg	20210908_205412_A.igm 20210908_205452_A.igm	2021_09_08_20_54_13_R_11 TA=27.8;TB=47.8;Gain=3	
11	21:13:18	2550	104	20210908211324610.jpg 20210908211330959.jpg 20210908211337309.jpg 20210908211343673.jpg 20210908211350023.jpg	20210908_211322_A.igm	2021_09_08_21_13_23_R_12 TA=24.1;TB=44.2;Gain=3	
12	21:24:24	2539	103	20210908212430088.jpg 20210908212436447.jpg 20210908212442796.jpg 20210908212449155.jpg	20210908_212427_A.igm	2021_09_08_21_24_29_R_13 TA=23.8;TB=43.9;Gain=3	
13	21:35:33	2566	104	20210908213540115.jpg 20210908213546464.jpg 20210908213552826.jpg 20210908213559175.jpg 20210908213605534.jpg 20210908213611899.jpg	20210908_213536_A.igm	2021_09_08_21_35_38_R_14 TA=23.0;TB=42.8;Gain=3	
14	21:56:30	2558	105	20210908215635735.jpg 20210908215642084.jpg 20210908215649354.jpg 20210908215655701.jpg 20210908215702065.jpg 20210908215708415.jpg 20210908215714779.jpg 20210908215721129.jpg 20210908215727478.jpg	20210908_215633_A.igm 20210908_215712_A.igm	2021_09_08_21_56_35_R_15 TA=24.2;TB=44.1;Gain=3	

Appendix B: Priority Sites Provided by EPA Region 6 & Louisiana Department of Environmental Quality

Facility_Name	Latitude	Longitude	Parish
Deltech LLC - Baton Rouge Facility	30.552892	-91.200536	East Baton Rouge
ExxonMobil Chemical Co - Baton Rouge Plastics Plant	30.551419	-91.175611	East Baton Rouge
ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644	East Baton Rouge
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Westlake Vinyls Co LP	30.209167	-91.017222	Ascension
Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219	East Baton Rouge
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586	Iberville
Rubicon LLC - Geismar Facility	30.20139	-91.01222	Ascension
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622	St. Charles
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145	Plaquemines
Axiall LLC - Plaquemine Facility	30.267167	-91.184258	Iberville
ExxonMobil Fuels & Lubricants Co - Baton Rouge Refinery	30.484392	-91.169444	East Baton Rouge
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387	East Baton Rouge
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884	Ascension
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles
BASF Corp - North Geismar Site	30.20594	-90.99195	Ascension
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333	Iberville
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist

Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472	St. John the Baptist
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508	Iberville
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333	Iberville
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631	Iberville
Targa Midstream Services LLC	29.237034	-89.384977	Plaquemines
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389	Iberville
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944	Terrebonne
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958	St. Charles
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833	Ascension
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278	Iberville
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833	Ascension
Dyno Nobel LA Ammonia LLC - Ammonia Production Facilty	29.964789	-90.264625	Jefferson
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792	Ascension
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles
CF INDUSTRIES	30.08328	-90.957665	Ascension

Appendix C: ASPECT Systems

The US EPA ASPECT system collects airborne infrared (IR) images and chemical screening data from a safe distance over the site (about 3,000 ft AGL). The system consists of an airborne high-speed Fourier Transform Infra-Red (FTIR) spectrometer coupled with a wide-area IR Line Scanner (IRLS). The ASPECT IR systems can detect chemical compounds in both the 8-to-12-micron (800 to 1200 cm-1) and 3 to 5 micron (2000 to 3200 cm-1) regions. List of chemicals and detection limits are listed in Table 1. The 8 to 12 micron region is typically known as the atmospheric window region since the band is reasonably void of water and carbon dioxide influence. Spectrally, this region is used to detect carbon - non-carbon bonded compounds. The 3 to 5 micron region is also free of water and carbon dioxide but typically does not have sufficient energy for use. This band does show use in high-energy environments such as fires. The carbon - hydrogen stretch is very common in this region.

An Imperx mapping camera (29 mega pixels; mapping focal plane array) is concurrently operated as part of all chemical collections. These images are often digitally processed in lower resolution, so they can be transmitted via satellite communication. All imagery is geo-rectified using both aircraft attitude correction (pitch, yaw, and roll) and GPS positional information. Imagery can be processed while in flight or approximately 600 frames per hour can be processed once the data are downloaded from the aircraft. The high-resolution images (>20 MB each) are pulled from the ASPECT after the sortie and are available later.

All aerial photographic images collected by the ASPECT system are ortho-rectified and geospatially validated by the scientific reach back team. In general, this consists of conducting geo-registration using a USGS Digital Elevation Model (DEM) which promotes superior pixel computation and lessens topographic distortion. The image is check by the team (using a Google Earth base map) for proper location and rotation.

Airborne radiological measurements are conducted using three fully integrated multi-crystal sodium iodide (NaI) RSX4 gamma ray spectrometers. Each RSX4 spectrometer contains four 4"x2"x16" doped NaI crystals each having an independent photomultiplier/ spectrometer assembly. One RSX unit is configured with an additional upward NaI crystal utilized to provide real-time cosmic ray correction. Count and energy data from each crystal and pack is combined using a self-calibrating signal processor to generate a virtual detector output. All radiological spectrometer "packs" are further combined using a signal console controlled by the on-board central computer in the aircraft. Altitude correction data is provided by a radar altimeter with internal GPS systems within the packs serving as a backup. It should be noted that no radiological measurements were conducted on this mission.

Data is processed using automated algorithms onboard the aircraft with preliminary results being sent using a satellite system to the ASPECT scientific reach back team for QA/QC analysis. Upon landing, preliminary data results are examined and validated by the

scientific reach back team.

Table 1. ASPECT Automated Compounds

This table contains ASPECT's library of automated compounds.
Detection limits are for each chemical is found in parenthesis in units of parts per million (ppm)

Acetic Acid (2.0)	Cumene (23.1)	Isoprene (6.5)	Phosphine (8.3)
Acetone (5.6)	Diborane (5.0)	Isopropanol (8.5)	Phosphorus Oxychloride (2.0)
Acrolein (8.8)	1,1-Dichloroethene (3.7)	Isopropyl Acetate (0.7)	Propyl Acetate (0.7)
Acrylonitrile (12.5)	Dichloromethane (6.0)	MAPP (3.7)	Propylene (3.7)
Acrylic Acid (3.3)	Dichlorodifluoromethane (0.7)	Methyl Acetate (1.0)	Propylene Oxide (6.8)
Allyl Alcohol (5.3)	1,1-Difluoroethane (0.8)	Methyl Acrylate (1.0)	Silicon Tetrafluoride (0.2)
Ammonia (2.0)	Difluoromethane (0.8)	Methyl Ethyl Ketone (7.5)	Sulfur Dioxide (15)
Arsine (18.7)	Ethanol (6.3)	Methanol (5.4)	Sulfur Hexafluoride (0.07)
Bis-Chloroethyl Ether (1.7)	Ethyl Acetate (0.8)	Methylbromide (60)	Sulfur Mustard (6.0)
Boron Tribromide (0.2)	Ethyl Acrylate (0.8)	Methylene Chloride (1.1)	Sulfuryl Fluoride (1.5)
Boron Triflouride (5.6)	Ethyl Formate (1.0)	Methyl Methacrylate (3.0)	Tetrachloroethylene (10)
1,3-Butadiene (5.0)	Ethylene (5.0)	MTEB (3.8)	1,1,1-Trichloroethane (1.9)
1-Butene (12.0)	Formic Acid (5.0)	Naphthalene (3.8)	Trichloroethylene (2.7)
2-Butene (18.8)	Freon 134a (0.8)	n-Butyl Acetate (3.8)	Trichloromethane (0.7)
Carbon Tetrachloride (0.2)	GA (Tabun) (0.7)	n-Butyl Alcohol (7.9)	Triethylamine (6.2)
Carbonyl Fluoride (0.8)	GB (Sarin) (0.5)	Nitric Acid (5.0)	Triethylphosphate (0.3)
Carbon Tetraflouride (0.1)	Germane (1.5)	Nitrogen Mustard (2.5)	Trimethylamine (9.3)
Chlorodifluoromethane (0.6)	Hexafluoroacetone (0.4)	Nitrogen Trifluoride (0.7)	Trimethyl Phosphite (0.4)
Chloromethane (12)	Isobutylene (15)	Phosgene (0.5)	Vinyl Acetate (0.6)

Message

From: Rick Turville [rick@spectralsystemsglobal.com]
Sent: 9/8/2021 8:48:08 PM
To: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
CC: mark [mark@spectralsystemsglobal.com]
Subject: Revised ASPECT report for 5 September 2021
Attachments: ASPECT Summary - Hurricane Ida 5 September 2021 V2.docx

Jill,
Please find attached a revised report for 5 September 2021. Table 2 was again changed due to a mistake in the met data.

R/ Rick

Airborne
Spectral
Photometric
Environmental
Collection
Technology

ASPECT Air Quality Survey
Baton Rouge, LA.
September 5, 2021

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ED_006338_00001241-00001

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Acronyms and Abbreviations

Alt	Altitude (in feet)
AGL	Above Ground Level
cm	centimeter
CDT	Central Daylight Time
DEM	Digital Elevation Model
ESF-10	Emergency Support Function #10 – Oil and Hazardous Materials Response
FEMA	Federal Emergency Management Agency
ft	feet
FTIR	Fourier Transform Infrared Spectrometer
FTP	File Transfer Protocol
igm	Spectral data format based on grams format
IR	Infrared
IRLS	Infrared Line Scanner
jpg	JPEG image format
kts	knots
mph	miles per hour
m/s	meters per second
MSIC	Digital photography file from the Imperx mapping camera
MSL	Mean Sea Level Altitude (in feet)
PAN	peroxyacetyl nitrate
Ppm	parts per million
RMP	Risk Management Plan

UTC	Universal Time Coordinated

Executive Summary

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 30 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2nd, 2021, the State of Louisiana requested ESF-10 assistance through FEMA and Region 6 asked for the ASPECT plane to be deployed in support of the response to Hurricane Ida. The state wanted assistance monitoring facility emissions in the industrial area between Baton Rouge and New Orleans, where flaring is resulting in the visible emission of black smoke.

ASPECT was tasked to perform remote chemical sensing over target properties to screen for airborne chemicals and take high-resolution photos to provide situational awareness. Potential areas identified for monitoring included: East Baton Rouge, Ascension, Iberville, St. James, St. John, St. Charles, Jefferson, and Orleans. The system conducted one flight mission on 2 September 2021 including air monitoring survey collections over the target area with favorable weather conditions for all passes. Although two black plumes were visible over one of the sites, no major emissions were detected with the FTIR.

A continuation of the overall Baton Rouge facility survey was conducted on 3 September 2021. Two data collection flights were conducted which bracketed a Presidential temporary flight restriction not allowing any flight activity. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Flight 5 and 6 were conducted as part of survey operations conducted on 4 September 2021. A total of 17 facilities were surveyed. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm in addition to ozone and peroxyacetyl nitrate. Analysis of IR imagery indicated that some facilities are showing hot process units.

ASPECT conducted two data collection missions on 5 September 2021 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

ASPECT Air Quality Survey
Hurricane IDA
Baton Rouge, LA
September 5, 2021

Background and Operational Overview

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 30 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On 2 September 2021, ASPECT was tasked to conduct a wide area air quality screening level assessment of areas populated with Risk Management Plan (RMP) sites and petrochemical facilities using the ASPECT system for detections of any airborne contaminants from ASPECT's 76 chemical detection library in the areas affected by Ida. The Region wanted to know if any detections were found, the location of the detection, and the concentration detected. Sites including Marathon Petroleum Company, Shell Norco Facility, and Phillips 66 pipeline site were surveyed. There were no chemical detections at the sites surveyed. Extremely slow satellite transmission speeds (possibly due to high bandwidth use by other first responders) resulted in long delays in data collection. Some chemical photos were pulled down during flight, with the majority needing to be pulled down with a more high-speed internet connection on the ground.

On 3 September 2021 ASPECT was tasked with a continuation of the general Baton Rouge area survey and conducted two flights. 8 locations in the Baton Rouge area were surveyed as part of two flights. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Two data collection flights were conducted on 4 September 2021 focusing on facilities south of Baton Rouge. A total of 29 active data collection passes were made covering 17 facilities. Analysis of IR imagery indicated that some facilities are showing hot process units. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm.

The mission focus for 5 September 2021 included a general survey of facilities in St. Bernard, Terrebonne, St. Charles, and St. James. In addition, a request was made to investigate potential oil sheens near Port Fourchon. Targeted facilities are given in table 1.

Table 1. Sites Covered on 5 September 2021 Flights 7 and 8

EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.64306	-90.9619
BASF Corp - Zachary Site	29.5476	-90.5232
Oil Sheening	29.4705	-89.9681
Targa Midstream Services LLC	29.23703	-89.385
IGP Methanol LLC - Gulf Coast Methanol Complex	29.62545	-89.9266
Phillips 66 Co - Alliance Refinery	29.68406	-89.9815
Stolthaven New Orleans, LLC - Braithwaite Facility	29.87092	-89.9493
Valero Refining - Meraux LLC - Meraux Refinery	29.93022	-89.9449
Chalmette Refining LLC	29.9379	-89.9699
Roehm America LLC - MMA Plant	29.9575	-90.2658
St Rose Refinery LLC - St Rose Refinery	29.95088	-90.3285
Valero Refining - New Orleans LLC - St Charles Refinery	29.98578	-90.3955
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.01541	-90.403
Shell Chemical LP - Norco Chemical Plant West Site	30.00493	-90.4224
Union Carbide Corp - St. Charles Plant	29.98229	-90.4556
Occidental Chemical Corp - Taft Plant	29.98722	-90.4547
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.85889	-90.4533
Denka Performance Elastomer LLC	30.05393	-90.5248
YCI Methanol Plant	29.97481	-90.8678
KMe St James Holdings LLC - Methanol Terminal	29.99092	-90.8412
Plains Marketing LP - St James Terminal	30.00434	-90.8484
NuStar Logistics LP - St James Terminal	30.03007	-90.8435
Mosaic Fertilizer LLC - Uncle Sam Plant	30.03722	-90.8275

General Mission Objectives

Once granted access to fly over the sites, the following general mission objectives were employed in conducting data collection with ASPECT:

1. To capture an overall, situational awareness of the incident using aerial photography with:
    - Oblique camera—photos taken by hand from the view/position of the co-pilot, and
    - MSIC photos—advanced camera mounted underneath the plane for a top-down view of the designated sites.
2. To qualitatively locate and characterize any the visible and non-visible components of a plume, as well as any areas on fire:

- Using the Infrared Line Scanner (IRLS)

3. To screen for the presence and location of specific chemicals within ASPECT's automated chemical detection library:
   - Using the Fourier Transform Infrared (FTIR) Spectrometer

Flight Conditions and Status

Weather and Site Conditions

Prior to each flight, an updated status of the current and forecasted weather, site conditions and any potential flight obstacles including radio towers impacting safety is assessed by the crew. A summary of the ground weather conditions during the missions can be found in Table 2 and 3.

Table 2. Ground Weather for Baton Rouge, LA, Flight 7
5 September 2021

Time	853	953	1053	1153	1253	1353
Wind direction	0 degrees N	270 degrees W	315 degrees NW	0 degrees	270 degrees W	292.5 degrees WNW
Wind speed	0.4 m/s (1.0 mph)	4.0 m/s (9.0 mph)	3.1 m/s (7.0 mph)	1.3 m/s (3.0 mph)	3.6 m/s (8.0 mph)	3.6 m/s (8.0 mph)
Temperature	27.2 C	28.3 C	29.4 C	30.6 C	31.7 C	32.2 C
Relative humidity	91	85	77	72	65	64
Dew point	25.6 C	25.6 C	25.0 C	25.0 C	24.4 C	24.4 C
Pressure	1013.3 mb	1013.6 mb	1013.9 mb	1013.6 mb	1012.6 mb	1011.9 mb
Ceiling	Few 2000 Ft	Scattered 1600 Ft	Broken 1600 Ft	Few 2400 Ft	Few 3400 Ft	Few 4100 Ft

Table 3. Ground Weather for Baton Rouge, LA, Flight 8
5 September 2021

Time	1553	1653	1753	1853
Wind direction	270 degrees W	270 degrees W	270 degrees W	180 degrees S
Wind speed	3.6 m/s (8.0 mph)	3.1 m/s (7.0 mph)	2.2 m/s (5.0 mph)	5.8 m/s (13.0 mph)
Temperature	32.8 C	32.8 C	31.7 C	28.9 C
Relative humidity	58	58	57	75
Dew point	23.3 C	23.3 C	22.2 C	23.9 C
Pressure	1010.6 mb	1009.9 mb	1009.9 mb	1009.9 mb
Ceiling	Few 4600 Ft	Few 4700 Ft	Clear	Few 3300 Ft

Data Results

The following data is provided as a summary analysis. All data products are available for the Region to access on a shared FTP site. For a complete list of available products, see

Appendix A. The data collected during these missions included a flight path summary, IRLS images, FTIR chemical identification and quantification, high resolution MSIC photos, and oblique photos.

Flight Paths

Wide, slow turns are required to be made in between runs to keep the instruments stable. The blue lines indicate the flight path while the green lines indicate the specific sections of the flight where chemical data was collected and processed. On Flight 1 the Baton Rouge area was surveyed, and the flight path is shown in Figure 1 and 2.

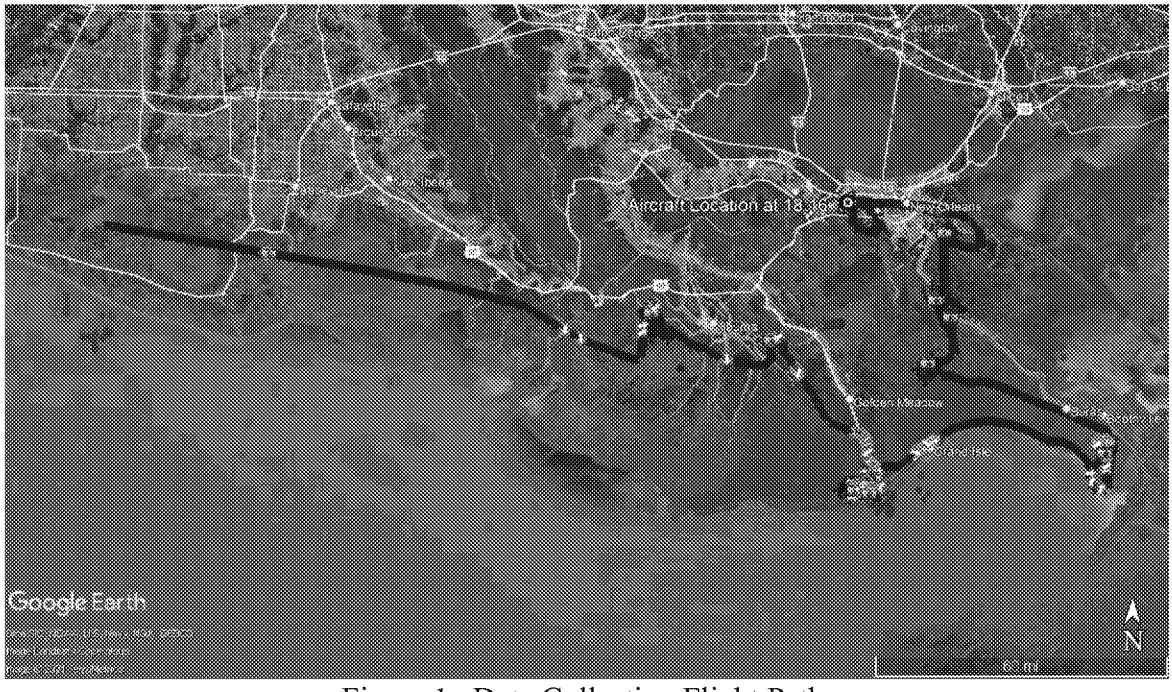

Figure 1. Data Collection Flight Path,
St. Bernard, Terrebonne, St. Charles, and St. James, Fight 7,
5 September 2021

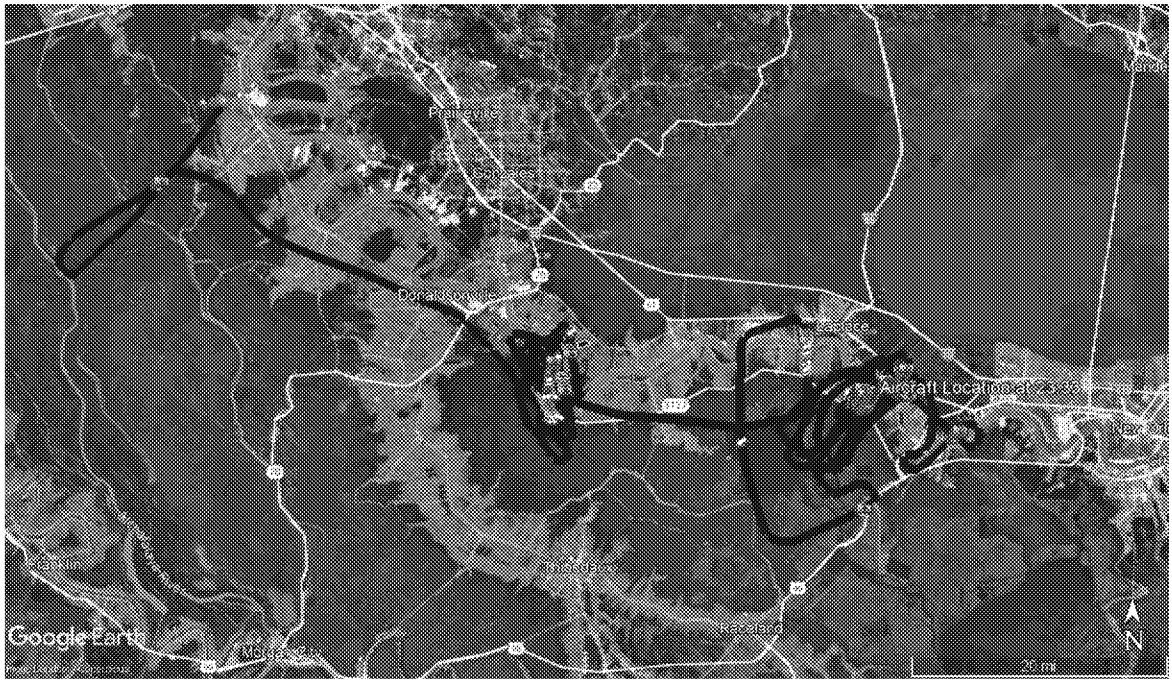

Figure 2. Data Collection Flight Path,
St. Bernard, Terrebonne, St. Charles, and St. James, Fight 8,
5 September 2021

Figure 3 shows a closeup detail of a portion of the mission for Flight 8 showing the flight path of the aircraft, the locations of the aerial photos, the portion of the flight line in which the FTIR was active (green) and the center point of the IRLS image (star).

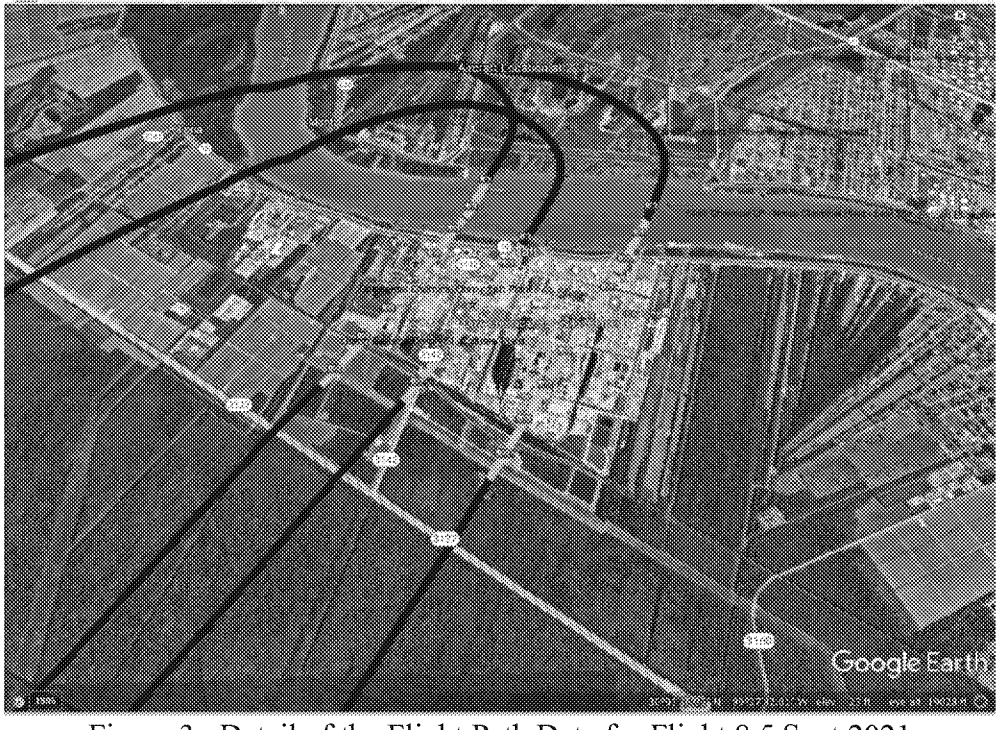

Figure 3. Detail of the Flight Path Data for Flight 8 5 Sept 2021

Line Scanner Data Results

A total of 34 data collection runs were made over the target facilities and an infrared line scanner image was generated for each collection run. Figure 4 shows a 3-band infrared image collected over the Chalmette Refinery. Thermal analysis of the imaged tended to show little with exception of a flare on the bottom of the image. No discharges were observed being emitted from the facility. Figure 5 shows an ASPECT pattern recognition product for oil detection of a light sheen observed near Port Fourchon.

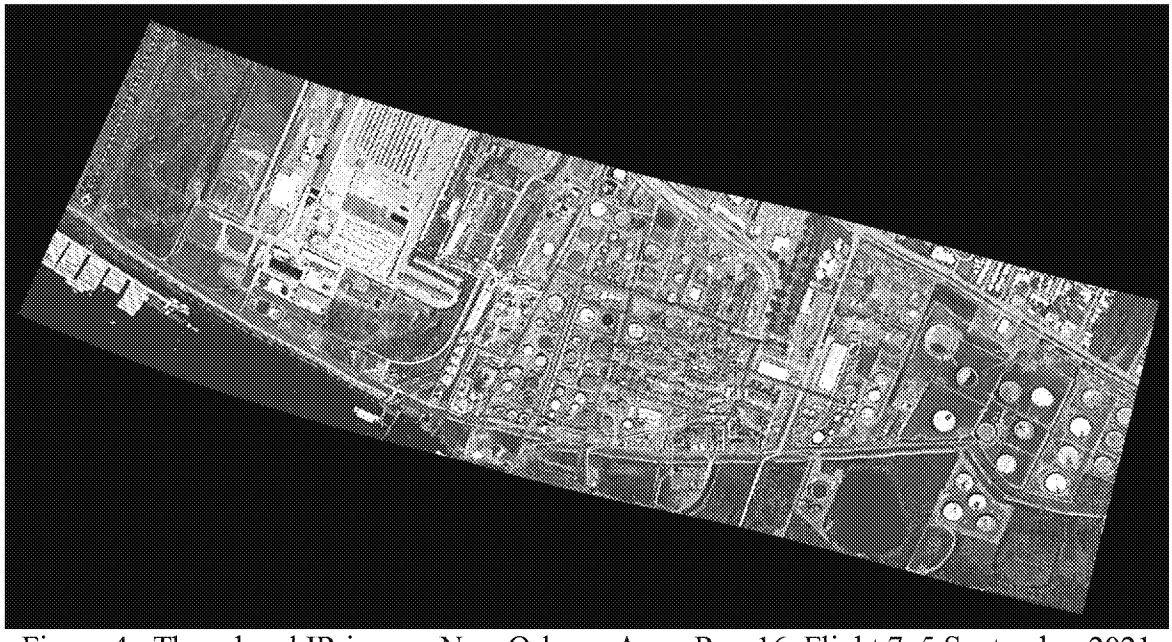

Figure 4. Three band IR image, New Orleans Area, Run 16, Flight 7, 5 September 2021

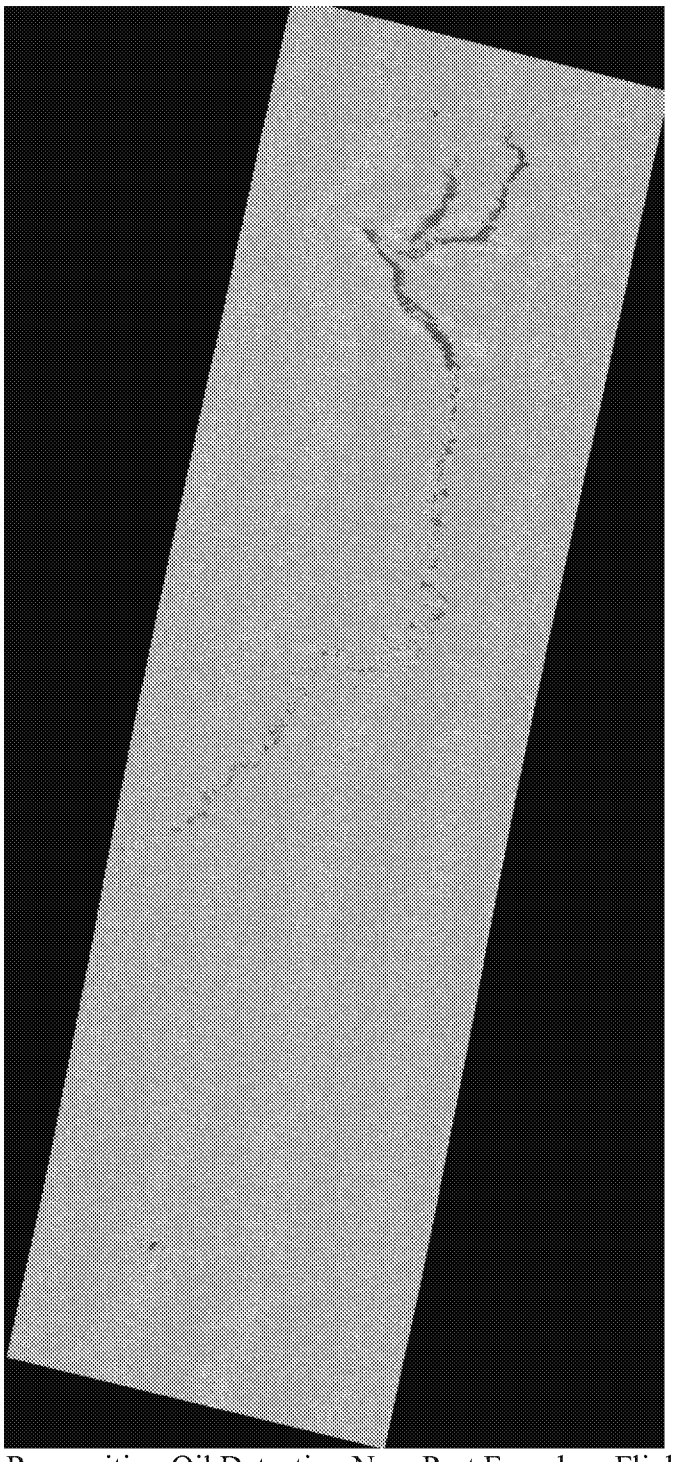

Figure 5. Pattern Recognition Oil Detection Near Port Fourchon Flight 7, 5 September 2021

FTIR Data Results

FTIR spectral data at a resolution of 16 wavenumbers was collected for each run. ASPECT uses an automated detection algorithm to permit compounds to be automatically analyzed while the aircraft is in flight. Seventy-six chemical compounds are included in the airborne algorithm library (the list is provided in Appendix B, Table 1). In addition, collected data was also manually quality checked against a collection of published library spectra for each chemical detected.

ASTECT did not detect any programmed compounds (those found in Appendix B, Table 1) as part of the mission over the target areas on the two flights conducted on 5 September 2021. Details of the monitoring results can be found in Table 4 and 5.

Table 4. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 7

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-05	14:26:39	Test	Test
2		15:05:49	ND	ND
3		15:12:54	ND	ND
4		15:28:49	ND	ND
5		15:49:04	ND	ND
6		15:55:08	ND	ND
7		15:59:39	ND	ND
8		16:06:38	ND	ND
9		16:33:52	ND	ND
10		16:45:19	ND	ND
11		17:05:35	ND	ND
12		17:17:48	ND	ND
13		17:24:43	ND	ND
14		17:33:04	ND	ND
15		17:43:57	ND	ND
16		17:59:09	ND	ND
17		18:15:46	ND	ND

Table 5. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 7

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-05	20:53:57	Test	Test
2		21:11:45	ND	ND
3		21:23:13	ND	ND
4		21:32:39	ND	ND
5		21:40:05	ND	ND
6		21:46:36	ND	ND
7		22:06:58	ND	ND
8		22:20:22	ND	ND
9		22:26:41	ND	ND
10		22:36:04	ND	ND
11		22:45:09	ND	ND
12		22:55:49	ND	ND
13		23:05:37	ND	ND
14		23:13:32	ND	ND
15		23:20:31	ND	ND
16		23:27:24	ND	ND
17		23:32:23	ND	ND

Aerial Photography Results

A full set of high-resolution aerial digital photography were collected as part of each data collection pass. Weather conditions over the survey had some low ceilings but a set of aerial images were collected at each location. Figures 6 shows a representative aerial image collected near Venice, La. Standing water is present in the secondary containment. Figure 7 shows an oblique image of a damaged oil facility showing what appears to be product within the facility containment structure.

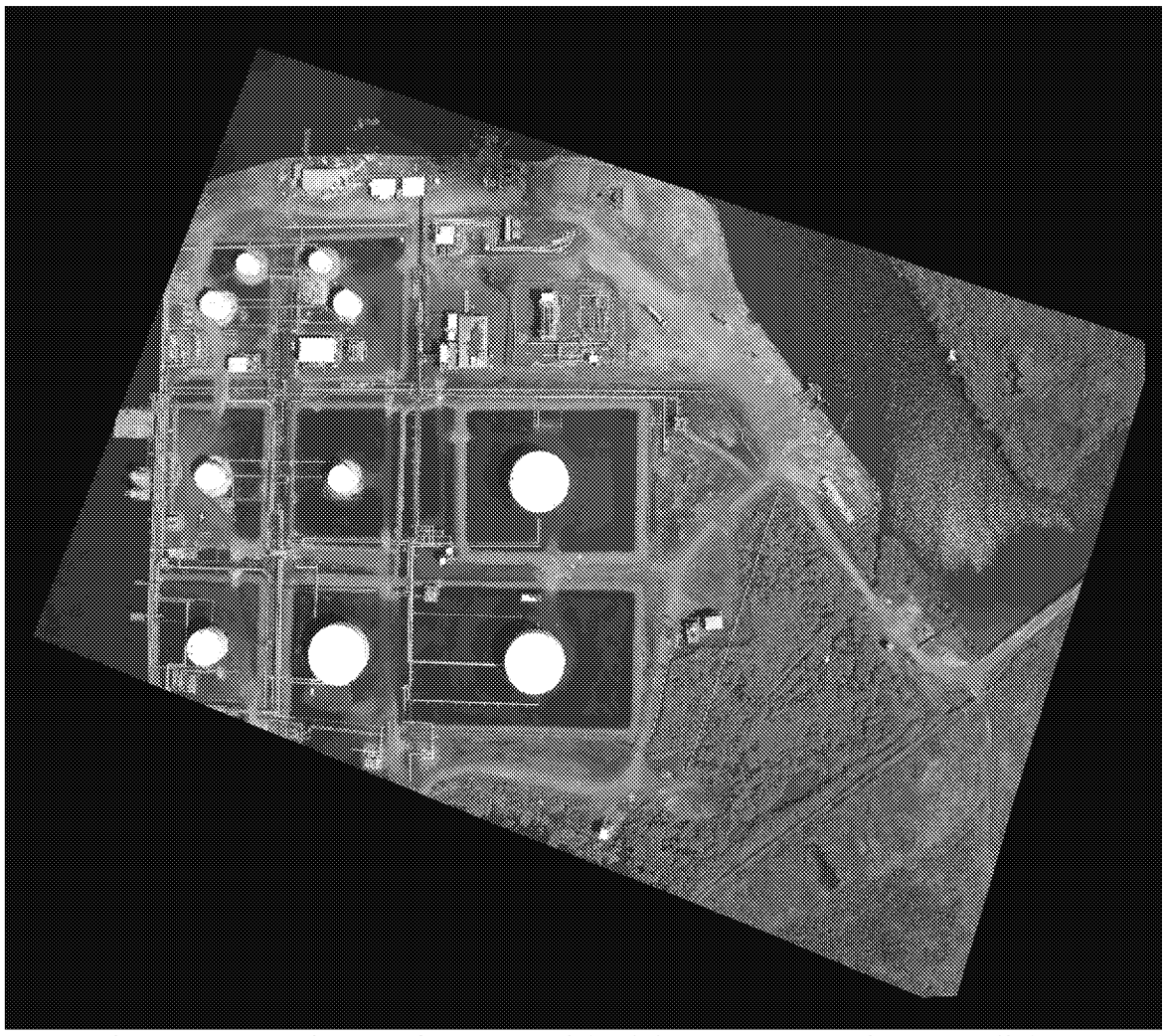

Figure 6. MSIC image of process unit/tank battery near Venice, LA, Flight 7, 5 September 2021

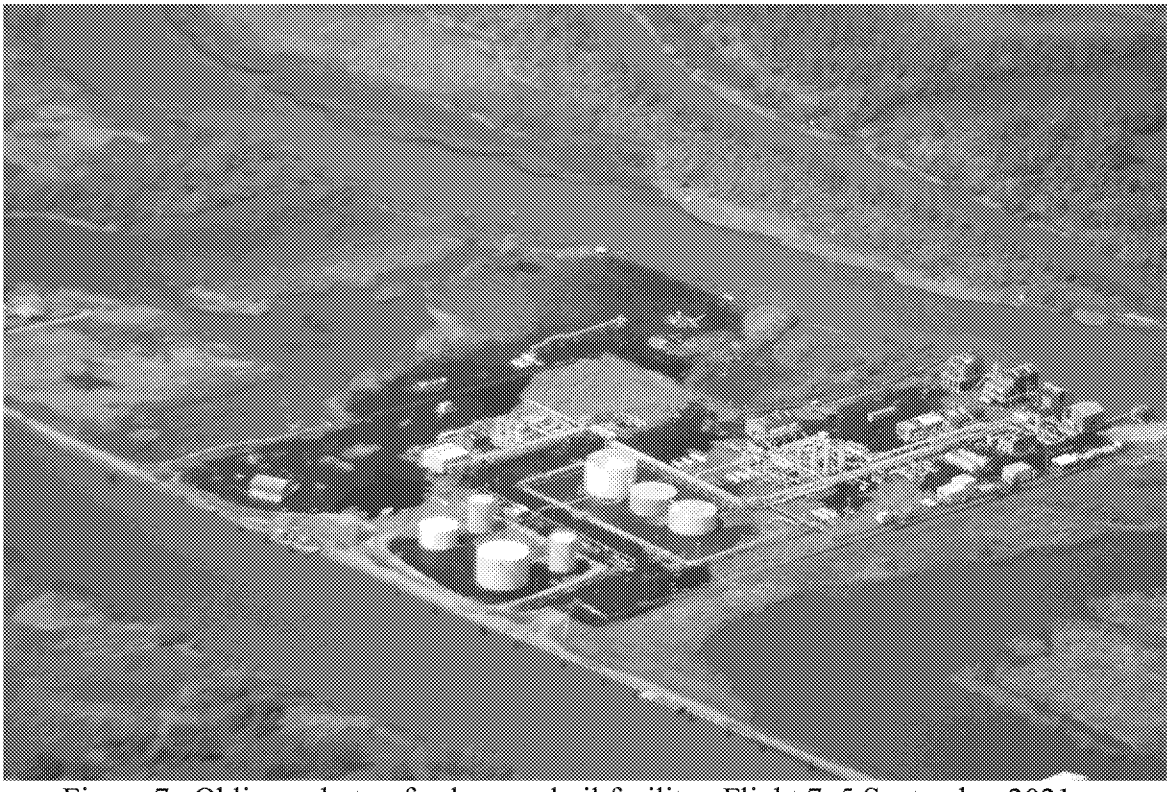

Figure 7. Oblique photo of a damaged oil facility. Flight 7, 5 September 2021

Conclusion

ASPECT conducted two data collection missions on 5 September 2021 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Appendix A: File Names of Data Collected During Flight

St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 7, 5 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	14:26:39	5783	150	20210905142645135.jpg 20210905142651499.jpg 20210905142657848.jpg	20210905_142642_A.igm	2021_09_05_14_26_43_R_01 TA=23.8;TB=44.5;Gain=3	
2	15:05:49	1597	107	20210905150555681.jpg 20210905150558395.jpg 20210905150602030.jpg 20210905150605655.jpg 20210905150609290.jpg 20210905150612925.jpg	20210905_150553_A.igm	2021_09_05_15_05_53_R_02 TA=23.3;TB=43.3;Gain=3	
3	15:12:54	1585	105	20210905151300566.jpg 20210905151304201.jpg 20210905151307836.jpg 20210905151310550.jpg 20210905151314186.jpg	20210905_151257_A.igm	2021_09_05_15_12_59_R_03 TA=24.4;TB=44.2;Gain=3	
4	15:28:49	1547	102	20210905152855666.jpg 20210905152859301.jpg 20210905152902936.jpg 20210905152905666.jpg 20210905152909285.jpg	20210905_152853_A.igm	2021_09_05_15_28_54_R_04 TA=24.9;TB=45.0;Gain=3	
5	15:49:04	1582	102	20210905154909526.jpg 20210905154913161.jpg 20210905154916793.jpg 20210905154920418.jpg 20210905154923148.jpg 20210905154926783.jpg	20210905_154907_A.igm	2021_09_05_15_49_08_R_05 TA=27.1;TB=47.2;Gain=3	
6	15:55:08	1554	110	20210905155514507.jpg 20210905155518126.jpg 20210905155521761.jpg 20210905155525389.jpg 20210905155528119.jpg 20210905155531754.jpg 20210905155535389.jpg 20210905155539008.jpg 20210905155541738.jpg 20210905155545373.jpg	20210905_155512_A.igm	2021_09_05_15_55_12_R_06 TA=25.4;TB=45.4;Gain=3	
7	15:59:39	1582	109	20210905155945966.jpg 20210905155949585.jpg 20210905155952315.jpg 20210905155955950.jpg 20210905155959585.jpg 20210905160003205.jpg 20210905160005935.jpg 20210905160009570.jpg 20210905160013205.jpg 20210905160016824.jpg 20210905160019553.jpg 20210905160023188.jpg 20210905160026808.jpg 20210905160030442.jpg 20210905160034077.jpg 20210905160036806.jpg 20210905160040426.jpg	20210905_155943_A.igm 20210905_160022_A.igm	2021_09_05_15_59_44_R_07 TA=24.6;TB=44.7;Gain=3	

8	16:06:38	1600	109	20210905160644505.jpg 20210905160648125.jpg 20210905160651759.jpg 20210905160655394.jpg 20210905160659031.jpg 20210905160701745.jpg 20210905160705380.jpg 20210905160709015.jpg 20210905160712650.jpg 20210905160715364.jpg 20210905160718999.jpg 20210905160722634.jpg 20210905160726269.jpg 20210905160728983.jpg 20210905160732618.jpg	20210905_160642_A.igm 20210905_160721_A.igm	2021_09_05_16_06_43_R_08 TA=23.5;TB=43.6;Gain=3	
9	16:33:52	2982	109	20210905163358700.jpg 20210905163405065.jpg 20210905163411414.jpg	20210905_163356_A.igm	2021_09_05_16_33_57_R_09 TA=24.5;TB=44.5;Gain=3	
10	16:45:19	3026	112	20210905164525989.jpg 20210905164532338.jpg 20210905164538687.jpg 20210905164545052.jpg 20210905164551401.jpg 20210905164557766.jpg 20210905164604115.jpg 20210905164610465.jpg	20210905_164523_A.igm 20210905_164601_A.igm	2021_09_05_16_45_24_R_10 TA=24.5;TB=44.3;Gain=3	
11	17:05:35	2929	115	20210905170540750.jpg 20210905170548004.jpg 20210905170554369.jpg	20210905_170538_A.igm	2021_09_05_17_05_40_R_11 TA=24.6;TB=44.7;Gain=3	
12	17:17:48	3031	113	20210905171754318.jpg 20210905171801588.jpg 20210905171807937.jpg	20210905_171751_A.igm	2021_09_05_17_17_53_R_12 TA=25.3;TB=45.5;Gain=3	
13	17:24:43	2972	105	20210905172449235.jpg 20210905172455584.jpg 20210905172501949.jpg 20210905172509203.jpg 20210905172515568.jpg 20210905172521917.jpg 20210905172528266.jpg	20210905_172445_A.igm 20210905_172526_A.igm	2021_09_05_17_24_48_R_13 TA=23.8;TB=43.8;Gain=3	
14	17:33:04	2968	107	20210905173310387.jpg 20210905173316752.jpg 20210905173323101.jpg 20210905173330355.jpg 20210905173336720.jpg 20210905173343069.jpg 20210905173349434.jpg 20210905173355783.jpg 20210905173402132.jpg 20210905173408497.jpg	20210905_173307_A.igm 20210905_173346_A.igm	2021_09_05_17_33_09_R_14 TA=27.9;TB=48.0;Gain=3	
15	17:43:57	2927	98	20210905174403166.jpg 20210905174410420.jpg	20210905_174400_A.igm	2021_09_05_17_44_02_R_15 TA=24.0;TB=44.1;Gain=3	
16	17:59:09	2874	112	20210905175915590.jpg 20210905175921955.jpg 20210905175928304.jpg 20210905175934669.jpg 20210905175941025.jpg 20210905175947380.jpg 20210905175953729.jpg 20210905180000078.jpg 20210905180006443.jpg	20210905_175912_A.igm 20210905_175952_A.igm	2021_09_05_17_59_14_R_16 TA=24.1;TB=44.1;Gain=3	

17	18:15:46	2946	107	20210905181551555.jpg 20210905181558824.jpg 20210905181605174.jpg	20210905_181548_A.igm	2021_09_05_18_15_51_R_17 TA=24.8;TB=44.8;Gain=3	

St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 8, 5 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	14:26:39	5783	150	20210905142645135.jpg 20210905142651499.jpg 20210905142657848.jpg	20210905_142642_A.igm	2021_09_05_14_26_43_R_01 TA=23.8;TB=44.5;Gain=3	
2	15:05:49	1597	107	20210905150555681.jpg 20210905150558395.jpg 20210905150602030.jpg 20210905150605655.jpg 20210905150609290.jpg 20210905150612925.jpg	20210905_150553_A.igm	2021_09_05_15_05_53_R_02 TA=23.3;TB=43.3;Gain=3	
3	15:12:54	1585	105	20210905151300566.jpg 20210905151304201.jpg 20210905151307836.jpg 20210905151310550.jpg 20210905151314186.jpg	20210905_151257_A.igm	2021_09_05_15_12_59_R_03 TA=24.4;TB=44.2;Gain=3	
4	15:28:49	1547	102	20210905152855666.jpg 20210905152859301.jpg 20210905152902936.jpg 20210905152905666.jpg 20210905152909285.jpg	20210905_152853_A.igm	2021_09_05_15_28_54_R_04 TA=24.9;TB=45.0;Gain=3	
5	15:49:04	1582	102	20210905154909526.jpg 20210905154913161.jpg 20210905154916793.jpg 20210905154920418.jpg 20210905154923148.jpg 20210905154926783.jpg	20210905_154907_A.igm	2021_09_05_15_49_08_R_05 TA=27.1;TB=47.2;Gain=3	
6	15:55:08	1554	110	20210905155514507.jpg 20210905155518126.jpg 20210905155521761.jpg 20210905155525389.jpg 20210905155528119.jpg 20210905155531754.jpg 20210905155535389.jpg 20210905155539008.jpg 20210905155541738.jpg 20210905155545373.jpg	20210905_155512_A.igm	2021_09_05_15_55_12_R_06 TA=25.4;TB=45.4;Gain=3	
7	15:59:39	1582	109	20210905155945966.jpg 20210905155949585.jpg 20210905155952315.jpg 20210905155955950.jpg 20210905155959585.jpg 20210905160003205.jpg 20210905160005935.jpg 20210905160009570.jpg 20210905160013205.jpg 20210905160016824.jpg 20210905160019553.jpg 20210905160023188.jpg 20210905160026808.jpg 20210905160030442.jpg 20210905160034077.jpg	20210905_155943_A.igm 20210905_160022_A.igm	2021_09_05_15_59_44_R_07 TA=24.6;TB=44.7;Gain=3	

				20210905160036806.jpg 20210905160040426.jpg			
8	16:06:38	1600	109	20210905160644505.jpg 20210905160648125.jpg 20210905160651759.jpg 20210905160655394.jpg 20210905160659031.jpg 20210905160701745.jpg 20210905160705380.jpg 20210905160709015.jpg 20210905160712650.jpg 20210905160715364.jpg 20210905160718999.jpg 20210905160722634.jpg 20210905160726269.jpg 20210905160728983.jpg 20210905160732618.jpg	20210905_160642_A.igm 20210905_160721_A.igm	2021_09_05_16_06_43_R_08 TA=23.5;TB=43.6;Gain=3	
9	16:33:52	2982	109	20210905163358700.jpg 20210905163405065.jpg 20210905163411414.jpg	20210905_163356_A.igm	2021_09_05_16_33_57_R_09 TA=24.5;TB=44.5;Gain=3	
10	16:45:19	3026	112	20210905164525989.jpg 20210905164532338.jpg 20210905164538687.jpg 20210905164545052.jpg 20210905164551401.jpg 20210905164557766.jpg 20210905164604115.jpg 20210905164610465.jpg	20210905_164523_A.igm 20210905_164601_A.igm	2021_09_05_16_45_24_R_10 TA=24.5;TB=44.3;Gain=3	
11	17:05:35	2929	115	20210905170540750.jpg 20210905170548004.jpg 20210905170554369.jpg	20210905_170538_A.igm	2021_09_05_17_05_40_R_11 TA=24.6;TB=44.7;Gain=3	
12	17:17:48	3031	113	20210905171754318.jpg 20210905171801588.jpg 20210905171807937.jpg	20210905_171751_A.igm	2021_09_05_17_17_53_R_12 TA=25.3;TB=45.5;Gain=3	
13	17:24:43	2972	105	20210905172449235.jpg 20210905172455584.jpg 20210905172501949.jpg 20210905172509203.jpg 20210905172515568.jpg 20210905172521917.jpg 20210905172528266.jpg	20210905_172445_A.igm 20210905_172526_A.igm	2021_09_05_17_24_48_R_13 TA=23.8;TB=43.8;Gain=3	
14	17:33:04	2968	107	20210905173310387.jpg 20210905173316752.jpg 20210905173323101.jpg 20210905173330355.jpg 20210905173336720.jpg 20210905173343069.jpg 20210905173349434.jpg 20210905173355783.jpg 20210905173402132.jpg 20210905173408497.jpg	20210905_173307_A.igm 20210905_173346_A.igm	2021_09_05_17_33_09_R_14 TA=27.9;TB=48.0;Gain=3	
15	17:43:57	2927	98	20210905174403166.jpg 20210905174410420.jpg	20210905_174400_A.igm	2021_09_05_17_44_02_R_15 TA=24.0;TB=44.1;Gain=3	
16	17:59:09	2874	112	20210905175915590.jpg 20210905175921955.jpg 20210905175928304.jpg 20210905175934669.jpg 20210905175941025.jpg 20210905175947380.jpg 20210905175953729.jpg	20210905_175912_A.igm 20210905_175952_A.igm	2021_09_05_17_59_14_R_16 TA=24.1;TB=44.1;Gain=3	

				20210905180000078.jpg 20210905180006443.jpg			
17	18:15:46	2946	107	20210905181551555.jpg 20210905181558824.jpg 20210905181605174.jpg	20210905_181548_A.igm	2021_09_05_18_15_51_R_17 TA=24.8;TB=44.8;Gain=3	

Appendix B: Priority Sites Provided by EPA Region 6 & Louisiana Department of Environmental Quality

Facility_Name	Latitude	Longitude	Parish
Deltech LLC - Baton Rouge Facility	30.552892	-91.200536	East Baton Rouge
ExxonMobil Chemical Co - Baton Rouge Plastics Plant	30.551419	-91.175611	East Baton Rouge
ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644	East Baton Rouge
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Westlake Vinyls Co LP	30.209167	-91.017222	Ascension
Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219	East Baton Rouge
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586	Iberville
Rubicon LLC - Geismar Facility	30.20139	-91.01222	Ascension
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622	St. Charles
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145	Plaquemines
Axiall LLC - Plaquemine Facility	30.267167	-91.184258	Iberville
ExxonMobil Fuels & Lubricants Co - Baton Rouge Refinery	30.484392	-91.169444	East Baton Rouge
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387	East Baton Rouge
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884	Ascension
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles

BASF Corp - North Geismar Site	30.20594	-90.99195	Ascension
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333	Iberville
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist
Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472	St. John the Baptist
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508	Iberville
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333	Iberville
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631	Iberville
Targa Midstream Services LLC	29.237034	-89.384977	Plaquemines
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389	Iberville
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944	Terrebonne
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958	St. Charles
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833	Ascension
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278	Iberville
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833	Ascension
Dyno Nobel LA Ammonia LLC - Ammonia Production Facilty	29.964789	-90.264625	Jefferson
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792	Ascension
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles
CF INDUSTRIES	30.08328	-90.957665	Ascension

Appendix C: ASPECT Systems

The US EPA ASPECT system collects airborne infrared (IR) images and chemical screening data from a safe distance over the site (about 3,000 ft AGL). The system consists of an airborne high-speed Fourier Transform Infra-Red (FTIR) spectrometer coupled with a wide-area IR Line Scanner (IRLS). The ASPECT IR systems can detect chemical compounds in both the 8-to-12-micron (800 to 1200 cm-1) and 3 to 5 micron (2000 to 3200 cm-1) regions. List of chemicals and detection limits are listed in Table 1. The 8 to 12 micron region is typically known as the atmospheric window region since the band is reasonably void of water and carbon dioxide influence. Spectrally, this region is used to detect carbon - non-carbon bonded compounds. The 3 to 5 micron region is also free of water and carbon dioxide but typically does not have sufficient energy for use. This band does show use in high-energy environments such as fires. The carbon - hydrogen stretch is very common in this region.

An Imperx mapping camera (29 mega pixels; mapping focal plane array) is concurrently operated as part of all chemical collections. These images are often digitally processed in lower resolution, so they can be transmitted via satellite communication. All imagery is geo-rectified using both aircraft attitude correction (pitch, yaw, and roll) and GPS positional information. Imagery can be processed while in flight or approximately 600 frames per hour can be processed once the data are downloaded from the aircraft. The high-resolution images (>20 MB each) are pulled from the ASPECT after the sortie and are available later.

All aerial photographic images collected by the ASPECT system are ortho-rectified and geospatially validated by the scientific reach back team. In general, this consists of conducting geo-registration using a USGS Digital Elevation Model (DEM) which promotes superior pixel computation and lessens topographic distortion. The image is check by the team (using a Google Earth base map) for proper location and rotation.

Airborne radiological measurements are conducted using three fully integrated multi-crystal sodium iodide (NaI) RSX4 gamma ray spectrometers. Each RSX4 spectrometer contains four 4"x2"x16" doped NaI crystals each having an independent photomultiplier/ spectrometer assembly. One RSX unit is configured with an additional upward NaI crystal utilized to provide real-time cosmic ray correction. Count and energy data from each crystal and pack is combined using a self-calibrating signal processor to generate a virtual detector output. All radiological spectrometer "packs" are further combined using a signal console controlled by the on-board central computer in the aircraft. Altitude correction data is provided by a radar altimeter with internal GPS systems within the packs serving as a backup. It should be noted that no radiological measurements were conducted on this mission.

Data is processed using automated algorithms onboard the aircraft with preliminary results being sent using a satellite system to the ASPECT scientific reach back team for QA/QC analysis. Upon landing, preliminary data results are examined and validated by the

scientific reach back team.

Table 1. ASPECT Automated Compounds

This table contains ASPECT's library of automated compounds.
Detection limits are for each chemical is found in parenthesis in units of parts per million (ppm)

Acetic Acid (2.0)	Cumene (23.1)	Isoprene (6.5)	Phosphine (8.3)
Acetone (5.6)	Diborane (5.0)	Isopropanol (8.5)	Phosphorus Oxychloride (2.0)
Acrolein (8.8)	1,1-Dichloroethene (3.7)	Isopropyl Acetate (0.7)	Propyl Acetate (0.7)
Acrylonitrile (12.5)	Dichloromethane (6.0)	MAPP (3.7)	Propylene (3.7)
Acrylic Acid (3.3)	Dichlorodifluoromethane (0.7)	Methyl Acetate (1.0)	Propylene Oxide (6.8)
Allyl Alcohol (5.3)	1,1-Difluoroethane (0.8)	Methyl Acrylate (1.0)	Silicon Tetrafluoride (0.2)
Ammonia (2.0)	Difluoromethane (0.8)	Methyl Ethyl Ketone (7.5)	Sulfur Dioxide (15)
Arsine (18.7)	Ethanol (6.3)	Methanol (5.4)	Sulfur Hexafluoride (0.07)
Bis-Chloroethyl Ether (1.7)	Ethyl Acetate (0.8)	Methylbromide (60)	Sulfur Mustard (6.0)
Boron Tribromide (0.2)	Ethyl Acrylate (0.8)	Methylene Chloride (1.1)	Sulfuryl Fluoride (1.5)
Boron Triflouride (5.6)	Ethyl Formate (1.0)	Methyl Methacrylate (3.0)	Tetrachloroethylene (10)
1,3-Butadiene (5.0)	Ethylene (5.0)	MTEB (3.8)	1,1,1-Trichloroethane (1.9)
1-Butene (12.0)	Formic Acid (5.0)	Naphthalene (3.8)	Trichloroethylene (2.7)
2-Butene (18.8)	Freon 134a (0.8)	n-Butyl Acetate (3.8)	Trichloromethane (0.7)
Carbon Tetrachloride (0.2)	GA (Tabun) (0.7)	n-Butyl Alcohol (7.9)	Triethylamine (6.2)
Carbonyl Fluoride (0.8)	GB (Sarin) (0.5)	Nitric Acid (5.0)	Triethylphosphate (0.3)
Carbon Tetraflouride (0.1)	Germane (1.5)	Nitrogen Mustard (2.5)	Trimethylamine (9.3)
Chlorodifluoromethane (0.6)	Hexafluoroacetone (0.4)	Nitrogen Trifluoride (0.7)	Trimethyl Phosphite (0.4)
Chloromethane (12)	Isobutylene (15)	Phosgene (0.5)	Vinyl Acetate (0.6)

Message

From: Rick Turville [rick@spectralsystemsglobal.com]
Sent: 9/10/2021 5:11:43 PM
To: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
Subject: FW: revised ASPECT report for 3 September 2021
Attachments: Revised ASPECT Report 3 September 2021 V2.docx

Jill,
See below. We reassessing all the spectra and revising for trace amounts.

Ley me know if this will work for you.

Regards, Rick

-------- Original message --------
From: Mark Thomas <mark@spectralsystemsglobal.com>
Date: 9/10/21 1:06 PM (GMT-05:00)
To: Rick Turville <rick@spectralsystemsglobal.com>, Kroutil Robert <robert.kroutil@kalmancoinc.com>
Subject: revised ASPECT report for 3 September 2021

Rick,

I have reanalyzed the ftir from flights 3 and 4 and have a revised report for those flights on 3 September. I found low levels of 1-butene, isoprene, and a little 1,3-butadiene in flight 4. I have made these changes in the report.

Mark J. Thomas, PhD
Spectral Systems Integration
2010 East Spruce Circle
Olathe, KS 66062

Phone: 256-453-9367
Email: mark@spectralsystemsglobal.com

Airborne
Spectral
Photometric
Environmental
Collection
Technology

ASPECT Air Quality Survey
Baton Rouge, LA.
3 September 2021

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ED_006338_00001254-00001

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Acronyms and Abbreviations

Alt	Altitude (in feet)
AGL	Above Ground Level
cm	centimeter
CST	Central Standard Time
DEM	Digital Elevation Model
Digital	Digital photography file from the Nikon D2X camera
ft	feet
FTIR	Fourier Transform Infrared Spectrometer
igm	Spectral data format based on grams format
IR	Infrared
IRLS	Infrared Line Scanner
jpg	JPEG image format
kts	knots
mph	miles per hour
m/s	meters per second
MSIC	Digital photography file from the Imperx mapping camera
MSL	Mean Sea Level Altitude (in feet)
ppm	parts per million
UTC	Universal Time Coordinated

Executive Summary

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 30 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2nd, 2021, the State of Louisiana requested ESF-10 assistance through FEMA and Region 6 asked for the ASPECT plane to be deployed in support of the response to Hurricane Ida. The state wanted assistance monitoring facility emissions in the industrial area between Baton Rouge and New Orleans, where flaring is resulting in the visible emission of black smoke.

ASPECT was tasked to perform remote chemical sensing over target properties to screen for airborne chemicals and take high-resolution photos to provide situational awareness. Potential areas identified for monitoring included: East Baton Rouge, Ascension, Iberville, St. James, St. John, St. Charles, Jefferson, and Orleans. The system conducted one flight mission on 2 September 2021 including air monitoring survey collections over the target area with favorable weather conditions for all passes. Although two black plumes were visible over one of the sites, no major emissions were detected with the FTIR.

A continuation of the overall Baton Rouge facility survey was conducted on 3 September 2021. Two data collection flights were conducted on 3 September 2021 as part of the overall Baton Rouge collection area. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. No compounds were detected on Flight 3. Post analysis of FTIR data collected on Flight 4 indicated that low levels of 1-butene (1.635 ppm), 1,3-butadiene (0.751 ppm) and isoprene (1.893 ppm) were present. Other than flares and isolated steam plumes, little process activity was noted in the data.

ASPECT Air Quality Survey
Hurricane IDA
Baton Rouge, LA
3 September 2021

Background and Operational Overview

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 30 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On 2 September 2021, ASPECT was tasked to conduct a wide area air quality screening level assessment of areas populated with Risk Management Plan (RMP) sites and petrochemical facilities using the ASPECT system for detections of any airborne contaminants from ASPECT's 76 chemical detection library in the areas affected by Ida. The Region wanted to know if any detections were found, the location of the detection, and the concentration detected. Sites including Marathon Petroleum Company, Shell Norco Facility, and Phillips 66 pipeline site were surveyed. There were no chemical detections at the sites surveyed. Extremely slow satellite transmission speeds (possibly due to high bandwidth use by other first responders) resulted in long delays in data collection. Some chemical photos were pulled down during flight, with the majority needing to be pulled down with a more high-speed internet connection on the ground.

ASPECT was tasked with a continuation of the general Baton Rouge area survey and conducted two flights on 3 September. Sites targeted for the 3 September 2021 survey are given in table 1. Due to a Presidential Temporary Flight restriction, flight 2 was cut short and was resumed later in the day as flight 3.

Table 1. Sites Covered on 03 September 2021 Flights 3 and 4

ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644
Formosa Plastics Corp Louisiana	30.501722	-91.185944
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586

Axiall LLC - Plaquemine Facility	30.267167	-91.184258
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278
Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333

General Mission Objectives

Once granted access to fly over the sites, the following general mission objectives were employed in conducting data collection with ASPECT:

1. To capture an overall, situational awareness of the incident using aerial photography with:
    - Oblique camera—photos taken by hand from the view/position of the co-pilot, and
    - MSIC photos—advanced camera mounted underneath the plane for a top-down view of the designated sites.
2. To qualitatively locate and characterize any the visible and non-visible components of a plume, as well as any areas on fire:
    - Using the Infrared Line Scanner (IRLS)
3. To screen for the presence and location of specific chemicals within ASPECT's automated chemical detection library:
    - Using the Fourier Transform Infrared (FTIR) Spectrometer

Flight Conditions and Status

Weather and Site Conditions

Prior to each flight, an updated status of the current and forecasted weather, site conditions and any potential flight obstacles including radio towers impacting safety is assessed by the crew. A summary of the ground weather conditions during the missions can be found in Table 2 and 3.

Table 2. Ground Weather for Baton Rouge, LA, Flight 3
3 September 2021

Time	1253	1353	1453	1553	1653
Wind direction	0 degrees	0 degrees N	0 degrees	0 degrees N	0 degrees N
Wind speed	1.3 m/s (3.0 mph)	2.2 m/s (5.0 mph)	0.0 m/s (0.0 mph)	2.7 m/s (6.0 mph)	3.1 m/s (7.0 mph)
Temperature	31.7 C	31.7 C	32.2 C	32.2 C	32.2 C
Relative humidity	59	61	60	58	56
Dew point	22.8 C	23.3 C	23.3 C	22.8 C	22.2 C
Pressure	1014.6 mb	1014.3 mb	1013.3 mb	1012.6 mb	1012.3 mb
Ceiling	Scattered 5000 Ft	Scattered 4000 Ft	Few 4200 Ft	Clear	Clear

Table 2. Ground Weather for Baton Rouge, LA, Flight 4
3 September 2021

Time	1653	1753	1853	1953	2053
Wind direction	0 degrees N	22.5 degrees NNE	45 degrees NE	45 degrees NE	0 degrees N
Wind speed	3.1 m/s (7.0 mph)	2.2 m/s (5.0 mph)	2.7 m/s (6.0 mph)	1.3 m/s (3.0 mph)	0.4 m/s (1.0 mph)
Temperature	32.2 C	31.7 C	29.4 C	27.8 C	26.1 C
Relative humidity	56	59	68	74	88
Dew point	22.2 C	22.8 C	22.8 C	22.8 C	23.9 C
Pressure	1012.3 mb	1012.3 mb	1012.6 mb	1012.6 mb	1012.9 mb
Ceiling	Clear	Clear	Clear	Clear	Clear

Data Results

The following data is provided as a summary analysis. All data products are available for the Region to access on a shared FTP site. For a complete list of available products, see Appendix A. The data collected during these missions included a flight path summary, IRLS images, FTIR chemical identification and quantification, high resolution MSIC photos, and oblique photos.

Flight Paths

Wide, slow turns are required to be made in between runs to keep the instruments stable. The blue lines indicate the flight path while the green lines indicate the specific sections of the flight where chemical data was collected and processed. On Flight 1 the Baton Rouge area was surveyed, and the flight path is shown in Figure 1.

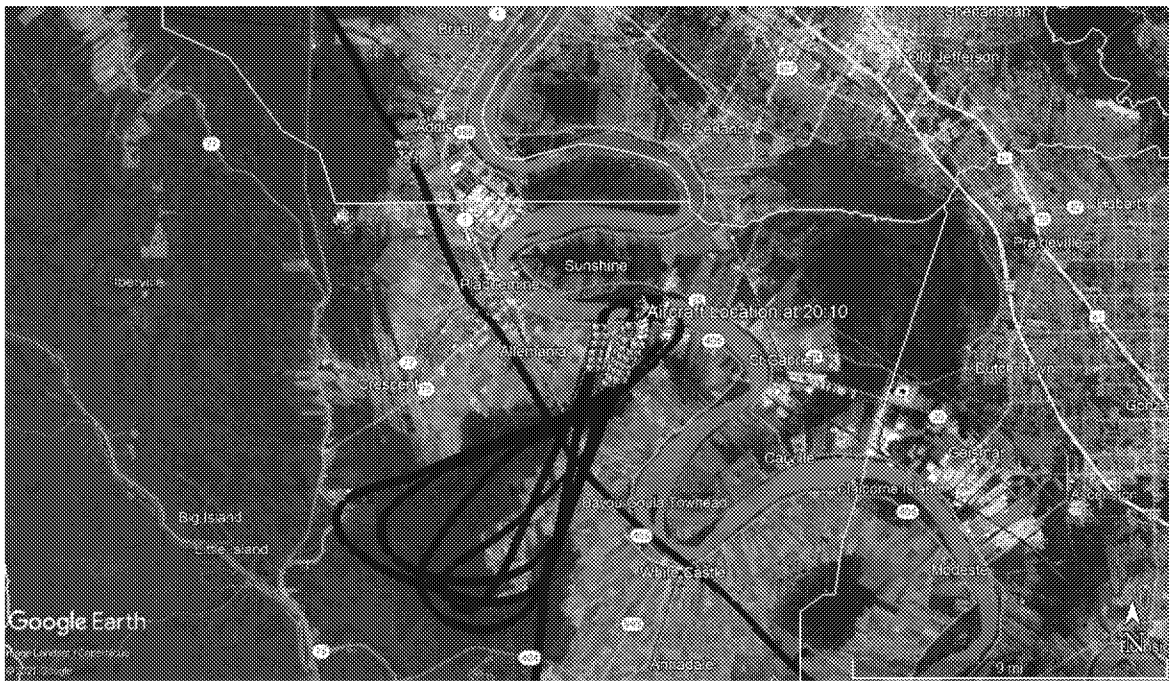

Figure 1. Data Collection Flight Path over the Baton Rouge Area Fight 3, 3 September 2021

Figure 2. Data Collection Flight Path over the Baton Rouge Area Fight 4, 3 September 2021

Line Scanner Data Results

A total of 14 data collection runs (2 system checks and 12 data runs) were made over the Baton Rouge area and during each collection run an infrared line scanner image was generated. Figure 3 shows a 3-band infrared image collected over a facility collected as part of flight 3. Minimum elevated thermal information is present in the image indicating little activity at the facility. Figure 4 shows a similar image collected on flight 4 with flare signatures present on the northern portion of the facility. No chemical plumes can be observed being emitted from the facility.

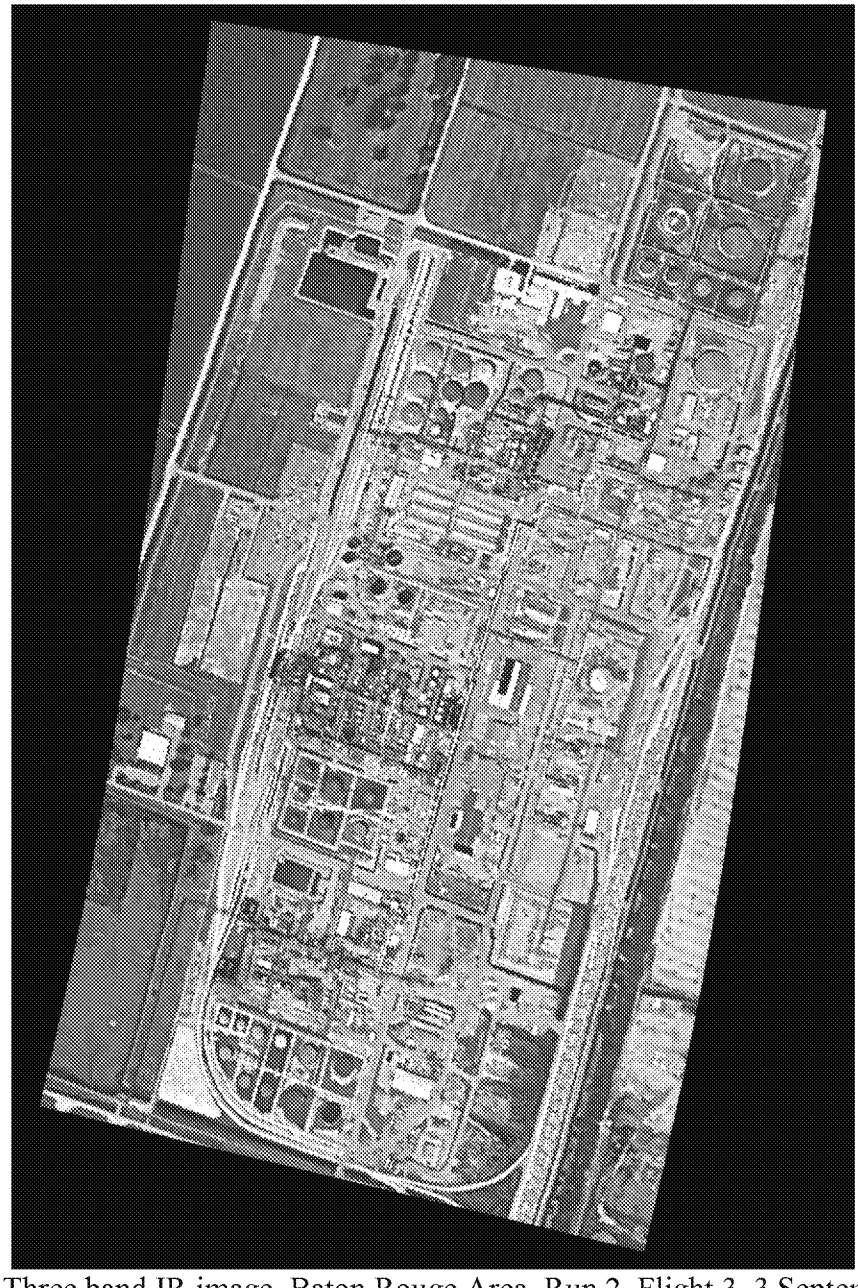

Figure 3. Three band IR image, Baton Rouge Area, Run 2, Flight 3, 3 September 2021

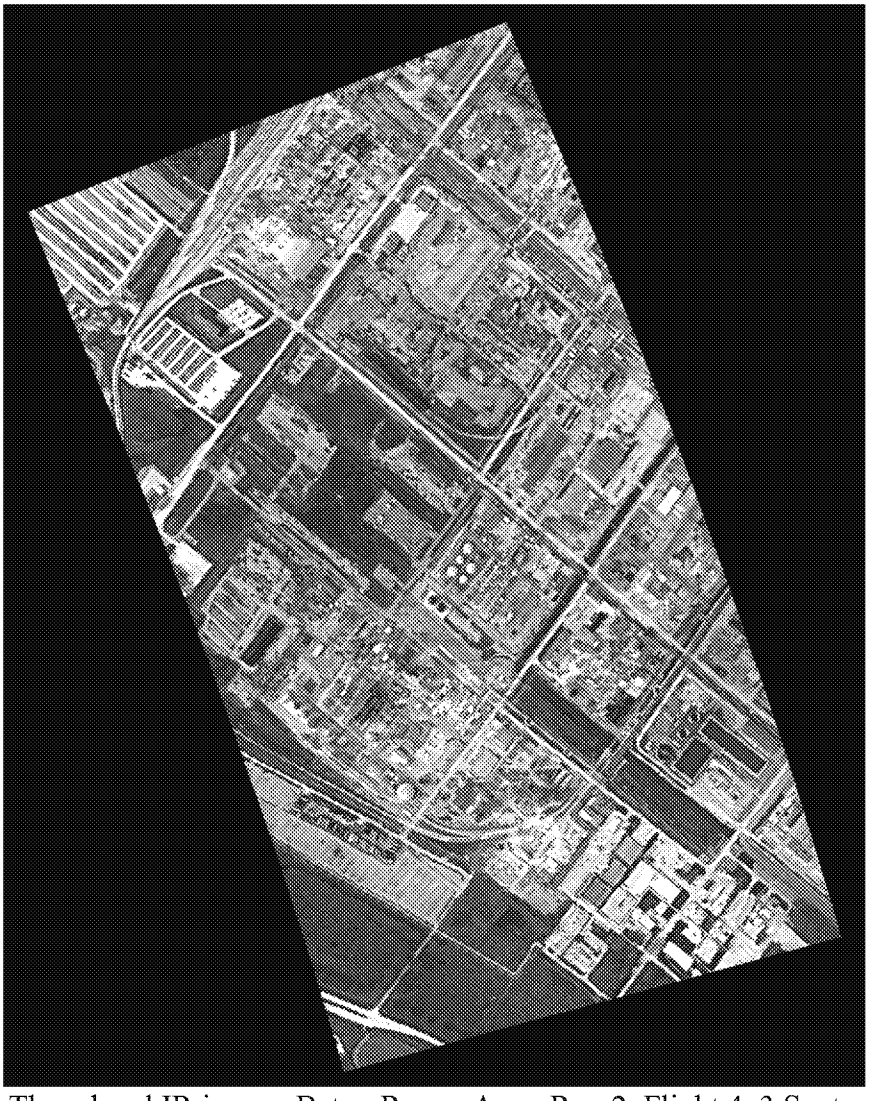

Figure 4. Three band IR image, Baton Rouge Area, Run 2, Flight 4, 3 September 2021

FTIR Data Results

FTIR spectral data at a resolution of 16 wavenumbers was collected for each run. ASPECT uses an automated detection algorithm to permit compounds to be automatically analyzed while the aircraft is in flight. Seventy-six chemical compounds are included in the airborne algorithm library (the list is provided in Appendix B, Table 1). In addition, collected data was also manually quality checked against a collection of published library spectra for each chemical detected.

Post analysis of collected data confirmed that ASTECT did not detect any programmed compounds (those found in Appendix B, Table 1) on Flight 3. Analysis of Flight 4 showed low levels of 1-butene, isoprene, and 1,3-butadiene. The locations of these detections are

given in figures 5A, 5B, and 5C. Details of the monitoring results can be found in Table3 3 and 4.

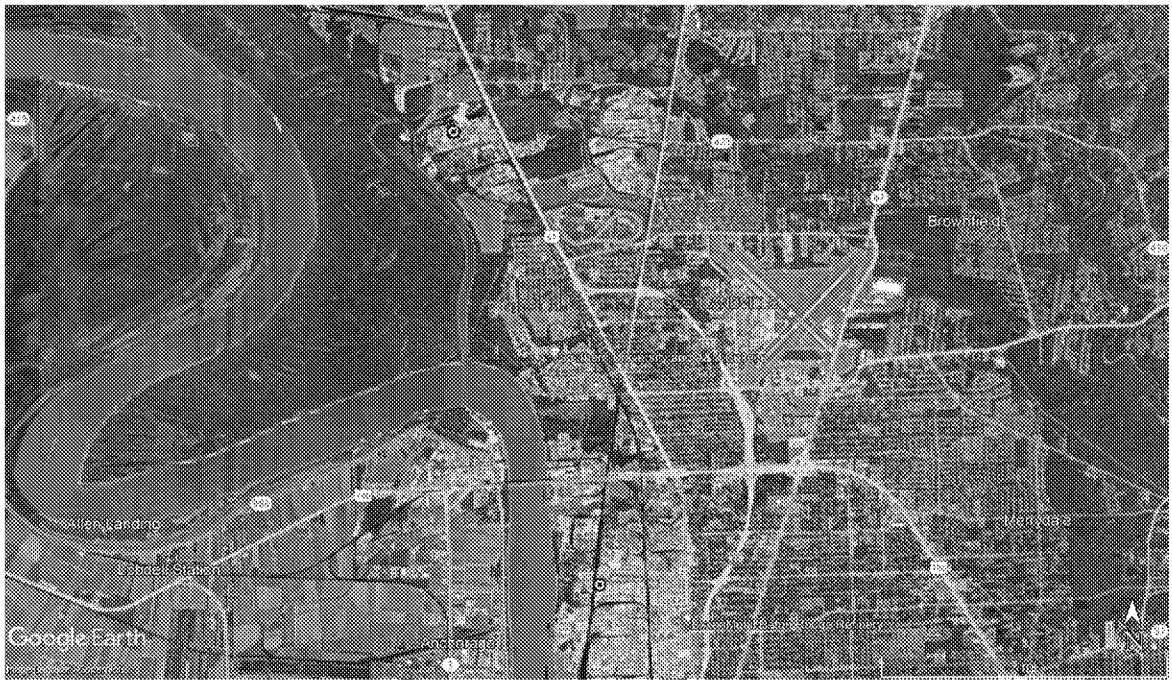

Figure 5A. 1-Butene Detection Locations, Flight 4, 3 September 2021

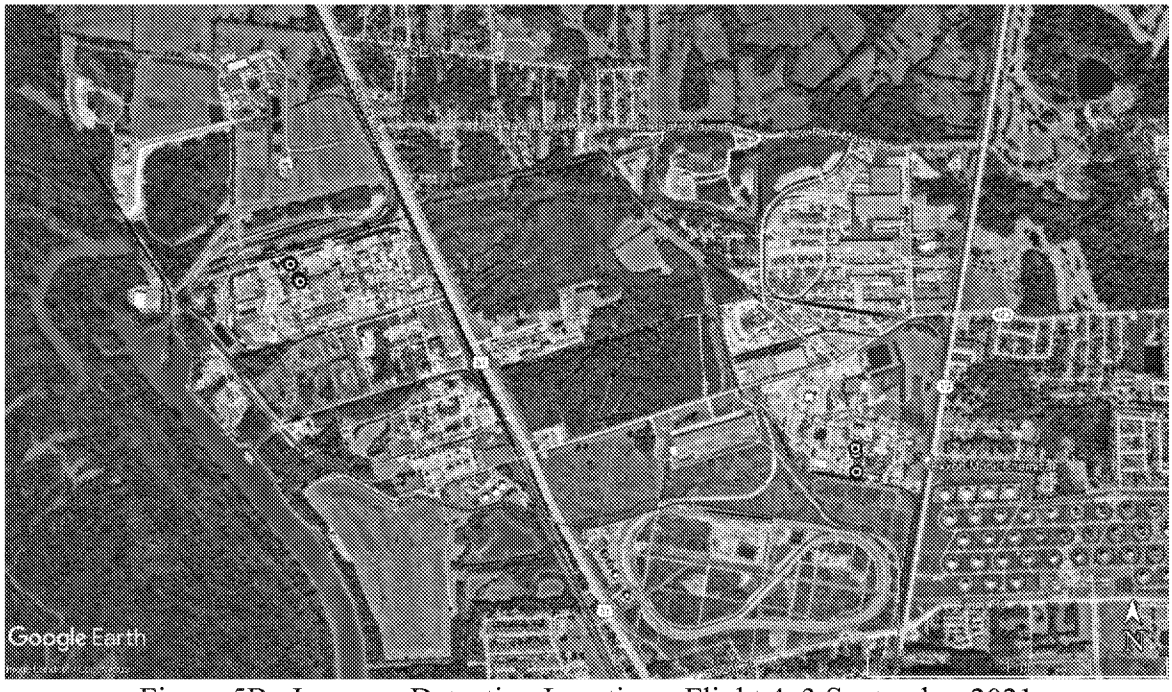

Figure 5B. Isoprene Detection Locations, Flight 4, 3 September 2021

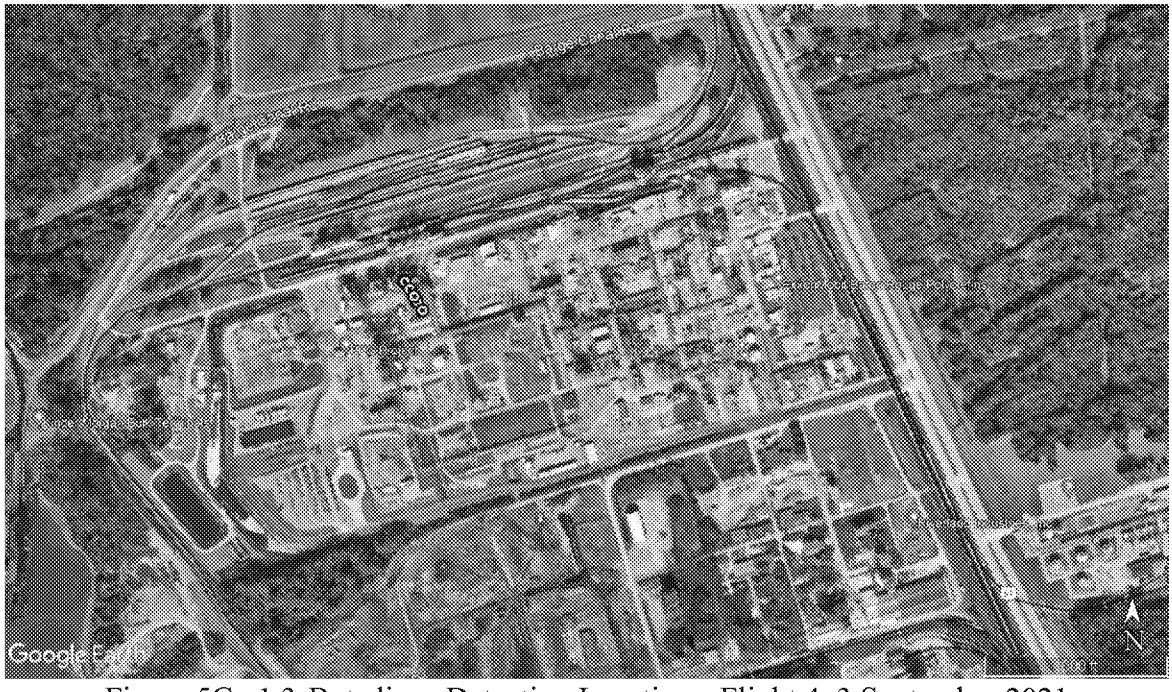

Figure 5C. 1,3-Butadiene Detection Locations, Flight 4, 3 September 2021

Table 3. Chemical Results Summary
Baton Rouge Collection Area, Flight 3

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-03	18:40:38	ND	ND
2		19:28:07	ND	ND
3		19:37:29	ND	ND
4		19:47:36	ND	ND
5		19:58:57	ND	ND
6		20:09:07	ND	ND

Table 4. Chemical Results Summary
Baton Rouge Collection Area, Flight 4

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-03	22:42:44	ND	ND
2		22:52:25	ND	ND
3		23:11:57	1-butene	1.635
4		23:24:41	ND	ND
5		23:39:47	butadiene isoprene	0.751 1.893

			1-butene	1.364
6		23:47:06	ND	ND
7		00:00:47	isoprene	0.845
8		00:09:49	isoprene	1.262

Aerial Photography Results

A full set of high-resolution aerial digital photography were collected as part of each data collection pass. Weather conditions over the Baton Rouge allowed high quality aerial images to be collected. Figures 4 shows an aerial image of part of the tank farm over the Exxon Chemical facility near Baton Rouge. It is noted that little water is present in the secondary containment structures. Figure 5 shows representative oblique image of the Westlake Plaquemine facility collected during flight 3. Some activity is present at the facility as evident by the steam plume being released from a process unit.

Figure 5. MSIC photo taken over the Exxon Chemical Facility in Baton Rouge, LA on 03 September 2021

Figure 6. Oblique photo taken over the Shintech Plaquemine Facility as part of Flight 3, 02 September 2021

Conclusion

Two data collection flights were conducted on 3 September 2021 as part of the overall Baton Rouge collection area. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. No compounds were detected on Flight 3. Post analysis of FTIR data collected on Flight 4 indicated that low levels of 1-butene (1.635 ppm), 1,3-butadiene (0.751 ppm) and isoprene (1.893 ppm) were present. Other than flares and isolated steam plumes, little process activity was noted in the data.

Appendix A: File Names of Data Collected During Flight

Baton Rouge Collection Areas, Flight 3, 3 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files
1	18:40:38	2877	119	20210903184044277.jpg 20210903184050635.jpg 20210903184057000.jpg	20210903_184041_A.igm	2021_09_03_18_40_43_R_01 TA=29.0;TB=49.2;Gain=3
2	19:28:07	2930	110	20210903192813180.jpg 20210903192819531.jpg 20210903192825896.jpg 20210903192832242.jpg 20210903192839510.jpg 20210903192845874.jpg	20210903_192810_A.igm	2021_09_03_19_28_12_R_02 TA=29.1;TB=49.3;Gain=3
3	19:37:29	2839	104	20210903193734248.jpg 20210903193741518.jpg 20210903193747867.jpg 20210903193754236.jpg 20210903193800578.jpg	20210903_193732_A.igm	2021_09_03_19_37_33_R_03 TA=29.2;TB=49.0;Gain=3
4	19:47:36	2899	109	20210903194742537.jpg 20210903194749801.jpg 20210903194756150.jpg 20210903194802499.jpg 20210903194808864.jpg 20210903194815213.jpg 20210903194821577.jpg 20210903194827921.jpg	20210903_194740_A.igm 20210903_194819_A.igm	2021_09_03_19_47_41_R_04 TA=29.4;TB=49.6;Gain=3
5	19:58:57	2861	107	20210903195903436.jpg 20210903195909802.jpg 20210903195916151.jpg 20210903195922510.jpg 20210903195928859.jpg 20210903195935223.jpg	20210903_195901_A.igm	2021_09_03_19_59_02_R_05 TA=28.8;TB=48.9;Gain=3
6	20:09:07	2890	110	20210903200913550.jpg 20210903200919899.jpg 20210903200926248.jpg 20210903200933507.jpg 20210903200939865.jpg 20210903200946223.jpg 20210903200952588.jpg 20210903200958938.jpg	20210903_200911_A.igm 20210903_200950_A.igm	2021_09_03_20_09_13_R_06 TA=28.7;TB=48.5;Gain=3

Baton Rouge Collection Areas, Flight 4, 3 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files
1	22:42:44	2812	104	20210903224250825.jpg 20210903224257175.jpg 20210903224303540.jpg 20210903224309890.jpg 20210903224316239.jpg 20210903224323508.jpg 20210903224329856.jpg 20210903224336220.jpg	20210903_224248_A.igm 20210903_224327_A.igm	2021_09_03_22_42_48_R_01 TA=30.0;TB=50.3;Gain=3
2	22:52:25	2876	109	20210903225230958.jpg 20210903225237307.jpg 20210903225244562.jpg 20210903225250927.jpg 20210903225257277.jpg 20210903225303629.jpg	20210903_225228_A.igm	2021_09_03_22_52_29_R_02 TA=25.5;TB=45.7;Gain=3
3	23:11:57	2883	110	20210903231203019.jpg 20210903231209368.jpg 20210903231215732.jpg	20210903_231200_A.igm 20210903_231240_A.igm	2021_09_03_23_12_01_R_03 TA=26.0;TB=46.0;Gain=3

				20210903231222987.jpg 20210903231229336.jpg 20210903231235701.jpg 20210903231242051.jpg 20210903231248416.jpg 20210903231254766.jpg 20210903231301115.jpg 20210903231307480.jpg 20210903231313830.jpg		
4	23:24:41	2893	110	20210903232447457.jpg 20210903232453806.jpg 20210903232501076.jpg 20210903232507426.jpg 20210903232513775.jpg 20210903232520141.jpg 20210903232526490.jpg 20210903232532839.jpg 20210903232539205.jpg 20210903232545554.jpg	20210903_232445_A.igm 20210903_232525_A.igm	2021_09_03_23_24_46_R_04 TA=25.5;TB=45.4;Gain=3
5	23:39:47	2903	105	20210903233953519.jpg 20210903233959869.jpg 20210903234006233.jpg 20210903234012583.jpg 20210903234018933.jpg 20210903234026203.jpg 20210903234032552.jpg 20210903234038917.jpg	20210903_233950_A.igm 20210903_234030_A.igm	2021_09_03_23_39_52_R_05 TA=24.8;TB=44.8;Gain=3
6	23:47:06	2896	112	20210903234712935.jpg 20210903234719285.jpg 20210903234725634.jpg 20210903234731999.jpg 20210903234738349.jpg 20210903234744698.jpg	20210903_234709_A.igm	2021_09_03_23_47_11_R_06 TA=22.8;TB=41.9;Gain=3
7	00:00:47	2885	106	20210904000052757.jpg 20210904000100011.jpg 20210904000106376.jpg 20210904000112723.jpg 20210904000119072.jpg 20210904000125438.jpg 20210904000131787.jpg 20210904000138147.jpg	20210904_000052_A.igm 20210904_000129_A.igm	2021_09_04_00_00_52_R_07 TA=21.7;TB=42.3;Gain=3
8	00:09:49	2915	106	20210904000955663.jpg 20210904001002027.jpg 20210904001008377.jpg 20210904001014727.jpg 20210904001021093.jpg 20210904001027442.jpg	20210904_000952_A.igm	2021_09_04_00_09_54_R_08 TA=20.9;TB=41.0;Gain=3

Appendix B: Priority Sites Provided by EPA Region 6 & Louisiana Department of Environmental Quality

Facility_Name	Latitude	Longitude	Parish
Deltech LLC - Baton Rouge Facility	30.552892	-91.200536	East Baton Rouge
ExxonMobil Chemical Co - Baton Rouge Plastics Plant	30.551419	-91.175611	East Baton Rouge
ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644	East Baton Rouge
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Westlake Vinyls Co LP	30.209167	-91.017222	Ascension
Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219	East Baton Rouge
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586	Iberville
Rubicon LLC - Geismar Facility	30.20139	-91.01222	Ascension
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622	St. Charles
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145	Plaquemines
Axiall LLC - Plaquemine Facility	30.267167	-91.184258	Iberville
ExxonMobil Fuels & Lubricants Co - Baton Rouge Refinery	30.484392	-91.169444	East Baton Rouge
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387	East Baton Rouge
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884	Ascension
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles
BASF Corp - North Geismar Site	30.20594	-90.99195	Ascension
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines

Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333	Iberville
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist
Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472	St. John the Baptist
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508	Iberville
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333	Iberville
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631	Iberville
Targa Midstream Services LLC	29.237034	-89.384977	Plaquemines
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389	Iberville
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944	Terrebonne
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958	St. Charles
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833	Ascension
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278	Iberville
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833	Ascension
Dyno Nobel LA Ammonia LLC - Ammonia Production Facilty	29.964789	-90.264625	Jefferson
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792	Ascension
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles
CF INDUSTRIES	30.08328	-90.957665	Ascension

Appendix C: ASPECT Systems

The US EPA ASPECT system collects airborne infrared (IR) images and chemical screening data from a safe distance over the site (about 3,000 ft AGL). The system consists of an airborne high-speed Fourier Transform Infra-Red (FTIR) spectrometer coupled with a wide-area IR Line Scanner (IRLS). The ASPECT IR systems can detect chemical compounds in both the 8-to-12-micron (800 to 1200 cm-1) and 3 to 5 micron (2000 to 3200 cm-1) regions. List of chemicals and detection limits are listed in Table 1. The 8 to 12 micron region is typically known as the atmospheric window region since the band is reasonably void of water and carbon dioxide influence. Spectrally, this region is used to detect carbon - non-carbon bonded compounds. The 3 to 5 micron region is also free of water and carbon dioxide but typically does not have sufficient energy for use. This band does show use in high-energy environments such as fires. The carbon - hydrogen stretch is very common in this region.

An Imperx mapping camera (29 mega pixels; mapping focal plane array) is concurrently operated as part of all chemical collections. These images are often digitally processed in lower resolution, so they can be transmitted via satellite communication. All imagery is geo-rectified using both aircraft attitude correction (pitch, yaw, and roll) and GPS positional information. Imagery can be processed while in flight or approximately 600 frames per hour can be processed once the data are downloaded from the aircraft. The high-resolution images (>20 MB each) are pulled from the ASPECT after the sortie and are available later.

All aerial photographic images collected by the ASPECT system are ortho-rectified and geospatially validated by the scientific reach back team. In general, this consists of conducting geo-registration using a USGS Digital Elevation Model (DEM) which promotes superior pixel computation and lessens topographic distortion. The image is check by the team (using a Google Earth base map) for proper location and rotation.

Airborne radiological measurements are conducted using three fully integrated multi-crystal sodium iodide (NaI) RSX4 gamma ray spectrometers. Each RSX4 spectrometer contains four 4"x2"x16" doped NaI crystals each having an independent photomultiplier/ spectrometer assembly. One RSX unit is configured with an additional upward NaI crystal utilized to provide real-time cosmic ray correction. Count and energy data from each crystal and pack is combined using a self-calibrating signal processor to generate a virtual detector output. All radiological spectrometer "packs" are further combined using a signal console controlled by the on-board central computer in the aircraft. Altitude correction data is provided by a radar altimeter with internal GPS systems within the packs serving as a backup. It should be noted that no radiological measurements were conducted on this mission.

Data is processed using automated algorithms onboard the aircraft with preliminary results being sent using a satellite system to the ASPECT scientific reach back team for QA/QC analysis. Upon landing, preliminary data results are examined and validated by the

scientific reach back team.

Table 1. ASPECT Automated Compounds

This table contains ASPECT's library of automated compounds.
Detection limits are for each chemical is found in parenthesis in units of parts per million (ppm)

Acetic Acid (2.0)	Cumene (23.1)	Isoprene (6.5)	Phosphine (8.3)
Acetone (5.6)	Diborane (5.0)	Isopropanol (8.5)	Phosphorus Oxychloride (2.0)
Acrolein (8.8)	1,1-Dichloroethene (3.7)	Isopropyl Acetate (0.7)	Propyl Acetate (0.7)
Acrylonitrile (12.5)	Dichloromethane (6.0)	MAPP (3.7)	Propylene (3.7)
Acrylic Acid (3.3)	Dichlorodifluoromethane (0.7)	Methyl Acetate (1.0)	Propylene Oxide (6.8)
Allyl Alcohol (5.3)	1,1-Difluoroethane (0.8)	Methyl Acrylate (1.0)	Silicon Tetrafluoride (0.2)
Ammonia (2.0)	Difluoromethane (0.8)	Methyl Ethyl Ketone (7.5)	Sulfur Dioxide (15)
Arsine (18.7)	Ethanol (6.3)	Methanol (5.4)	Sulfur Hexafluoride (0.07)
Bis-Chloroethyl Ether (1.7)	Ethyl Acetate (0.8)	Methylbromide (60)	Sulfur Mustard (6.0)
Boron Tribromide (0.2)	Ethyl Acrylate (0.8)	Methylene Chloride (1.1)	Sulfuryl Fluoride (1.5)
Boron Triflouride (5.6)	Ethyl Formate (1.0)	Methyl Methacrylate (3.0)	Tetrachloroethylene (10)
1,3-Butadiene (5.0)	Ethylene (5.0)	MTEB (3.8)	1,1,1-Trichloroethane (1.9)
1-Butene (12.0)	Formic Acid (5.0)	Naphthalene (3.8)	Trichloroethylene (2.7)
2-Butene (18.8)	Freon 134a (0.8)	n-Butyl Acetate (3.8)	Trichloromethane (0.7)
Carbon Tetrachloride (0.2)	GA (Tabun) (0.7)	n-Butyl Alcohol (7.9)	Triethylamine (6.2)
Carbonyl Fluoride (0.8)	GB (Sarin) (0.5)	Nitric Acid (5.0)	Triethylphosphate (0.3)
Carbon Tetraflouride (0.1)	Germane (1.5)	Nitrogen Mustard (2.5)	Trimethylamine (9.3)
Chlorodifluoromethane (0.6)	Hexafluoroacetone (0.4)	Nitrogen Trifluoride (0.7)	Trimethyl Phosphite (0.4)
Chloromethane (12)	Isobutylene (15)	Phosgene (0.5)	Vinyl Acetate (0.6)

Message

From: Argenta, Edward [Argenta.Edward@epa.gov]
Sent: 9/11/2021 2:35:35 AM
To: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
Subject: RE: ASPECT Grid Flight

Yes and yes, once LOSCO identifies which grids they want, I will produce a map that has the grids with the GPS POIs also. We'll maximize hitting the targets somehow…may have to jive left or right…I don't know. We have 2.5 hrs to figure it out tomorrow morning ☺.

I'll also make the 1 pager once I have those details.

Edward Argenta Jr
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Office of Emergency Management
Argenta.edward@epa.gov
Gov't Mobile: 202.843.4511
Office #: 202.564.4528
Office: WJC-N - B517R

From: Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Sent: Friday, September 10, 2021 10:33 PM
To: Argenta, Edward <Argenta.Edward@epa.gov>
Subject: FW: ASPECT Grid Flight

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Friday, September 10, 2021 9:32 PM
To: Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Cc: Delgado, Eric <Delgado.Eric@epa.gov>
Subject: RE: ASPECT Grid Flight

I assume that you will still be flying over some of there targets by doing the grid pattern, correct? I don't necessarily have a problem with it but would like Eric to chime in here. At some point, can we get the grids on a map that they want with the coordinates of the facilities of interest on them so that we are doing both at the same time. Just a thought? I think we typically utilize the USCG Quarter Quarter Quads (2 mile X 2 mile). At this late time and date, I am not sure if we can do it that way. I think input from Eric is needed as well.

Ed will likely have to inform FEMA of your mission as well.

Thanks,
Gary Moore

From: Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Sent: Friday, September 10, 2021 9:08 PM
To: Delgado, Eric <Delgado.Eric@epa.gov>; Moore, Gary <Moore.Gary@epa.gov>; Patel, Anish <patel.anish@epa.gov>
Cc: Argenta, Edward <Argenta.Edward@epa.gov>; Honnellio, Anthony <Honnellio.Anthony@epa.gov>
Subject: FW: ASPECT Grid Flight

Hello Eric, Gary, and Anish,

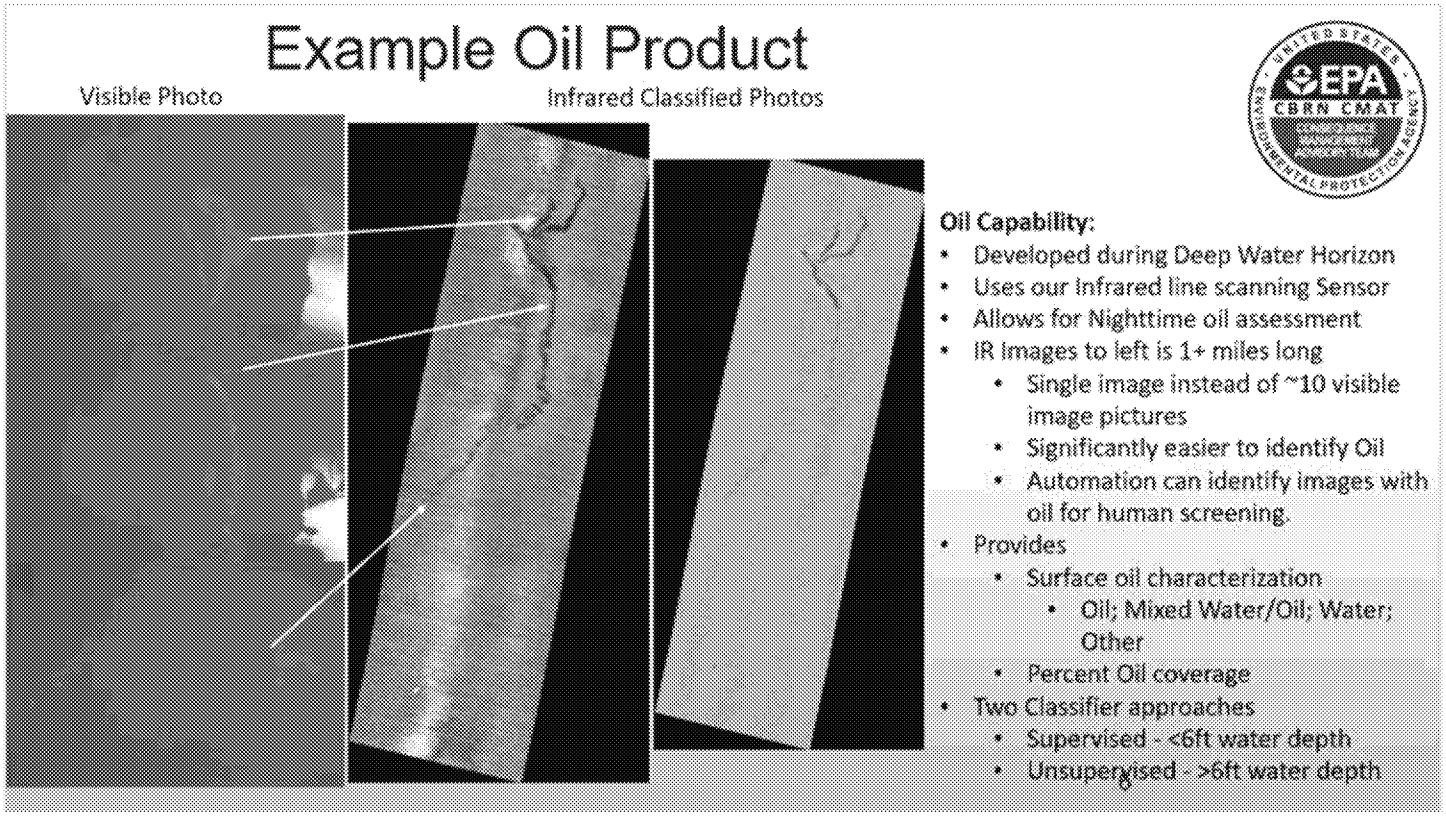
I spoke with Gina Saizan this evening and she was looking for suggestions for how we might best execute the oil surveillance mission. She said the points that they had provided were places where oil had been seen/detected over the past few days, but they are really looking for more wide-area coverage to track the sites that have already been identified and to look for more sites.

We discussed a plan to execute a systematic grid flight pattern while trying to identify targets of opportunity within the cells. We asked LOSCO to provide a selection of (8) 10x10 mile grid boxes which they would like us to work in. We plan to fly straight lines spaced every two miles within the grid boxes. The IRLS produces a ½ mile wide foot print underneath. We'll tell the pilots to watch for sheens and if they should identify one that may be missed with our grid design we may adjust our flight path to make a pass and collect data on them.

The back-up plan to this grid approach is connect the dots with the way points in an efficient manner.

We asked LOSCO to pick which grid boxes they'd like us to focus on. We provided them with a heat map analysis of their POIs with 10x10 mile cells.

I'd also like to pass along this slide to help illustrate to LOSCO the data products they will receive.



I have provided the email that I sent to Gina with the example grid pattern below – they will provide us with which cells they would like us to cover in the morning. Please let us know if you have any questions/suggestions.

This will be a new mission type for the crew, but I spoke with both sides of the contracting teams and they are ready and up to the challenge.

Thanks,
Jill

From: Taylor, Jillianne
Sent: Friday, September 10, 2021 8:51 PM
To: Gina.Saizan@la.gov
Subject: ASPECT Grid Flight

Hi Gina,

I have attached a PDF with an example of the grid lines that we think would get us the most aerial coverage while also trying to maximize efficiency. We think we can do up to 8 10 mile x 10 mile grid cells by flying 2 mile flight lines. If you just let us know which 8 cells you would prefer (preferably in a 20 mile x 40 mile configuration, though we can adjust if you have a preference), we will make our plan accordingly.

Please let me know if you have any questions!

Thank you,
Jill

Jill Taylor
Atmospheric Scientist, ASPECT
CBRN Consequence Management Advisory Division
Environmental Protection Agency
1201 Elm St., Dallas, TX 75270
Work Cell: 214-406-9896

Message

From: Honnellio, Anthony [Honnellio.Anthony@epa.gov]
Sent: 9/2/2021 2:22:40 PM
To: Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) [Kevin.N.Herr@uscg.mil]; Richmond, Patrick L CWO-3 USCG HQS (USA) [Patrick.L.Richmond@uscg.mil]; D05-DG-M-MIFCLANT-GEOINT [D05-DG-M-MIFCLANT-GEOINT@uscg.mil]
CC: Argenta, Edward [Argenta.Edward@epa.gov]; Taylor, Jillianne [Taylor.Jillianne@epa.gov]; MunizTirado, Ernesto CDR USCG MIFC LANT (USA) [Ernesto.Muniz@uscg.mil]; Leclaire, Matthew J CIV USCG MIFC LANT (USA) [Matthew.J.Leclaire@uscg.mil]
Subject: RE: EPA ASPECT Opening Up Lines of Communication

We will be flying in the Terrell, TX this morning for calibrations.

Tony Honnellio
Health Physicist
EPA ASPECT (Detail)
5 Post Office Square, Suite 100
Boston, MA 02109-3912
W: 617 918-1456
C: 617 947-4414
F: 617 918-0456

From: Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) <Kevin.N.Herr@uscg.mil>
Sent: Thursday, September 2, 2021 10:12 AM
To: Honnellio, Anthony <Honnellio.Anthony@epa.gov>; Richmond, Patrick L CWO-3 USCG HQS (USA) <Patrick.L.Richmond@uscg.mil>; D05-DG-M-MIFCLANT-GEOINT <D05-DG-M-MIFCLANT-GEOINT@uscg.mil>
Cc: Argenta, Edward <Argenta.Edward@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; MunizTirado, Ernesto CDR USCG MIFC LANT (USA) <Ernesto.Muniz@uscg.mil>; Leclaire, Matthew J CIV USCG MIFC LANT (USA) <Matthew.J.Leclaire@uscg.mil>
Subject: RE: EPA ASPECT Opening Up Lines of Communication

Mr. Honnellio,

Do you know rough area you intend to fly? I may have targets where you want to be.

VR
LT Kevin Herr
RFI/CRM/COM/ISR Manager
Area Command

O: 314-269-2642
C: 813-217-3418

From: Honnellio, Anthony <Honnellio.Anthony@epa.gov>
Sent: Thursday, September 2, 2021 9:45 AM
To: Richmond, Patrick L CWO-3 USCG HQS (USA) <Patrick.L.Richmond@uscg.mil>; D05-DG-M-MIFCLANT-GEOINT <D05-DG-M-MIFCLANT-GEOINT@uscg.mil>

Cc: Argenta, Edward <Argenta.Edward@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; MunizTirado, Ernesto CDR USCG MIFC LANT (USA) <Ernesto.Muniz@uscg.mil>; Leclaire, Matthew J CIV USCG MIFC LANT (USA) <Matthew.J.Leclaire@uscg.mil>; Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) <Kevin.N.Herr@uscg.mil>
Subject: [Non-DoD Source] RE: EPA ASPECT Opening Up Lines of Communication

Thank you for your timely response Chief Warrant Officer Richmond,

The ASPECT Team is looking forward to the opportunity to collaborate and can grant permission for the current mission's data to reside on your stormsite. That may change depending on our customer, but likely would not be an issue in the future then either. We have our pre-flight safety briefing in ~1 hour and wheels up shortly thereafter. I'll be reaching out to LT Herr (with a cc to MIFCLANT) shortly. Thank you again for your assistance, and please let me know if you have any questions.

Very Respectfully,

Tony Honnellio
Health Physicist
EPA ASPECT (Detail)
5 Post Office Square, Suite 100
Boston, MA 02109-3912
W: 617 918-1456
C: 617 947-4414
F: 617 918-0456

From: Richmond, Patrick L CWO-3 USCG HQS (USA) <Patrick.L.Richmond@uscg.mil>
Sent: Thursday, September 2, 2021 9:26 AM
To: Honnellio, Anthony <Honnellio.Anthony@epa.gov>; D05-DG-M-MIFCLANT-GEOINT <D05-DG-M-MIFCLANT-GEOINT@uscg.mil>
Cc: Argenta, Edward <Argenta.Edward@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; MunizTirado, Ernesto CDR USCG MIFC LANT (USA) <Ernesto.Muniz@uscg.mil>; Leclaire, Matthew J CIV USCG MIFC LANT (USA) <Matthew.J.Leclaire@uscg.mil>; Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) <Kevin.N.Herr@uscg.mil>
Subject: RE: EPA ASPECT Opening Up Lines of Communication

Mr. Honnelio,

LT Kevin Herr (CC`d) is running the ISR Collections for Hurricane Ida response. I believe he is the best POC for coordination of flights and coordination for dissemination of data to the appropriate preventions teams.

If able, our team would like to also been copied on any dissemination to the above MIFCLANT Distro email. Also would like permission to hang any products on our stormsite for larger distribution to interested customers. Let me know if that will be an issue

Regards,

CWO3 Patrick L. Richmond
Maritime Intelligence Fusion Center, Atlantic
W: 757-492-4474
C: 508-564-2979

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and is not to be released to the public or other personnel who do not have a valid "need-to-know" without prior approval.

From: Honnellio, Anthony <Honnellio.Anthony@epa.gov>
Sent: Thursday, September 2, 2021 9:12 AM
To: Richmond, Patrick L CWO-3 USCG HQS (USA) <Patrick.L.Richmond@uscg.mil>; D05-DG-M-MIFCLANT-GEOINT <D05-DG-M-MIFCLANT-GEOINT@uscg.mil>
Cc: Argenta, Edward <Argenta.Edward@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Subject: [Non-DoD Source] EPA ASPECT Opening Up Lines of Communication

Good Day,

The U.S. Environmental Protection Agency's (EPA) Airborne Spectrographic Photometric Environmental Collection Technology (ASPECT - https://www.epa.gov/emergency-response/aspect) airplane is anticipating a Mission Assignment (MA) to fly in LA. ASPECT provides the capability to provide near real-time screening data for chemical and radiological hazards as well as NADIR/Oblique photometric data. We will be running test flights this morning, and would like to initiate data sharing with USGS HDDS with the assistance USCG District 5/Maritime Intelligence Fusion Center-Atlantic (MIFCLANT) GEOINT team. Any guidance you may be able to provide such that we can start providing data to the right folks while ASPECT is wheels up would be appreciated. Data sets include near real time XML of our flights with initial low resolution data images. ASPECT will also conduct scanning with our chemical sensors and taking Nadir and oblique (as identified by the pilots) photos. Please let me know if you have any questions.

Very Respectfully,

Tony Honnellio
Health Physicist
EPA ASPECT (Detail)
5 Post Office Square, Suite 100
Boston, MA 02109-3912
W: 617 918-1456
C: 617 947-4414
F: 617 918-0456

Message

From: Argenta, Edward [Argenta.Edward@epa.gov]
Sent: 9/12/2021 12:20:12 AM
To: McKown, Cody [cody.mckown@fema.dhs.gov]; Russell, Glen [glen.russell@fema.dhs.gov]; Mak, Morgan [morgan.mak@fema.dhs.gov]; Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) [Kevin.N.Herr@uscg.mil]; Icaza, Arturo [arturo.icaza@fema.dhs.gov]
CC: Honnellio, Anthony [Honnellio.Anthony@epa.gov]; Taylor, Jillianne [Taylor.Jillianne@epa.gov]; Pandey, Siddharth (CTR) [siddharth.pandey@associates.fema.dhs.gov]; Perovich, Gina [Perovich.Gina@epa.gov]; Jakabhazy, Elise [Jakabhazy.Elise@epa.gov]; Luke, April [Luke.April@epa.gov]
Subject: RE: EPA ASPECT Mission Plan for Hurricane Ida Response - 20210911 Summary
Attachments: FEMA_20210912_EPA_Ida_Response.pptx

Hi All,

ASPECT is in route back to home base Addison, TX after a very long (~12hrs of flying + 2 hrs for refueling) but successful day over Southern LA. We were able to grid fly 6 of the 8 regions requested. We also detected at least 3 oil emissions that were nearly impossible to see in the visible pictures and no reports from the pilots but they appeared brightly in our Infrared detection technology. There may be more detections once we download the entire dataset and review it. We have shared this information with the region and LOSCO also. See the attached slide for a graphical representation of our day.

We decided to perform a long day today due to the uncertain and deteriorating weather predicted for tomorrow and the remainder of the week. We have no plans to fly tomorrow nor the early part of the week in support of the ESF10 MA for Hurricane Ida in LA due to the weather. ASPECT is mission ready for other regions/areas should a need arise.

Respectfully,
Ed

Edward Argenta Jr
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
Argenta.edward@epa.gov
Gov't Mobile: 202.843.4511
Office #: 202.564.4528
Office: WJC-N - B517R

From: Argenta, Edward
Sent: Saturday, September 11, 2021 10:37 AM
To: 'McKown, Cody' <cody.mckown@fema.dhs.gov>; 'Russell, Glen' <glen.russell@fema.dhs.gov>; 'Mak, Morgan' <morgan.mak@fema.dhs.gov>; 'Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA)' <Kevin.N.Herr@uscg.mil>; 'Icaza, Arturo' <arturo.icaza@fema.dhs.gov>
Cc: Honnellio, Anthony <Honnellio.Anthony@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; 'Pandey, Siddharth (CTR)' <siddharth.pandey@associates.fema.dhs.gov>; Perovich, Gina <Perovich.Gina@epa.gov>; Jakabhazy, Elise <Jakabhazy.Elise@epa.gov>; Luke, April <Luke.April@epa.gov>
Subject: EPA ASPECT Mission Plan for Hurricane Ida Response - 20210911 New POIs

Good morning,

EPA ASPECT has received new targets from LDEQ and LOSCO via our ESF10 mission assignment to investigate oil spill reports and collect additional information using our infrared detection capability. Please see the attached summary of

our mission areas for the day. We plan to execute ~5 straight line passes through each grid box and do ad hoc passes of "targets of opportunity."

I will update our plan for tomorrow later this evening. WX is the concern for tomorrow and most of next week.

Please let me know if you have any questions,
Ed

Edward Argenta Jr
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
Argenta.edward@epa.gov
Gov't Mobile: 202.843.4511
Office #: 202.564.4528
Office: WJC-N - B517R

From: Argenta, Edward
Sent: Wednesday, September 8, 2021 8:35 PM
To: McKown, Cody <cody.mckown@fema.dhs.gov>; Russell, Glen <glen.russell@fema.dhs.gov>; Mak, Morgan <morgan.mak@fema.dhs.gov>; Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) <Kevin.N.Herr@uscg.mil>; Icaza, Arturo <arturo.icaza@fema.dhs.gov>
Cc: Honnellio, Anthony <Honnellio.Anthony@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; Pandey, Siddharth (CTR) <siddharth.pandey@associates.fema.dhs.gov>; Perovich, Gina <Perovich.Gina@epa.gov>; Jakabhazy, Elise <Jakabhazy.Elise@epa.gov>
Subject: EPA ASPECT Mission Plan for Hurricane Ida Response - Initial Task Complete

All,

EPA ASPECT has collected at least 2 data passes for all of the initial facilities we were tasked with and is currently in flight back to Addison, TX (Home Base). We may be tasked with additional sites. If that occurs, I will resume creating a one slide overview of our mission if that is beneficial/needed.

Please let me know if you have any questions; it was great working with you.

Respectfully,
Ed

Edward Argenta Jr
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Office of Emergency Management
Argenta.edward@epa.gov
Gov't Mobile: 202.843.4511
Office #: 202.564.4528
Office: WJC-N - B517R

From: Argenta, Edward
Sent: Tuesday, September 7, 2021 11:01 PM
To: 'McKown, Cody' <cody.mckown@fema.dhs.gov>; 'Russell, Glen' <glen.russell@fema.dhs.gov>; 'Mak, Morgan'

<morgan.mak@fema.dhs.gov>; 'Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA)' <Kevin.N.Herr@uscg.mil>
Cc: Honnellio, Anthony <Honnellio.Anthony@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; 'Pandey, Siddharth (CTR)' <siddharth.pandey@associates.fema.dhs.gov>; Perovich, Gina <Perovich.Gina@epa.gov>; Jakabhazy, Elise <Jakabhazy.Elise@epa.gov>
Subject: EPA ASPECT Mission Plan for Hurricane Ida Response - 20210908

All,

EPA ASPECT plans to fly on 20210908. See the attached slide for details. We are targeting sites we only collected 1 data pass on to enhance our screening as well as additional targets of opportunity as we fly. This may be EPA's final day in the region unless additional POIs are identified by LA and shared/tasked to EPA OR if a new assignment comes in from another federal partner.

Respectfully,
Ed

Edward Argenta Jr
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
Argenta.edward@epa.gov
Gov't Mobile: 202.843.4511
Office #: 202.564.4528
Office: WJC-N - B517R

From: Argenta, Edward
Sent: Tuesday, September 7, 2021 9:55 AM
To: 'McKown, Cody' <cody.mckown@fema.dhs.gov>; 'Russell, Glen' <glen.russell@fema.dhs.gov>; 'Mak, Morgan' <morgan.mak@fema.dhs.gov>; 'Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA)' <Kevin.N.Herr@uscg.mil>
Cc: Honnellio, Anthony <Honnellio.Anthony@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; 'Pandey, Siddharth (CTR)' <siddharth.pandey@associates.fema.dhs.gov>; Perovich, Gina <Perovich.Gina@epa.gov>; Jakabhazy, Elise <Jakabhazy.Elise@epa.gov>
Subject: EPA ASPECT Mission Plan for Hurricane Ida Response - 20210907

All,

EPA ASPECT is inbound into the AOR. See the attached slide for details. We are targeting sites we only collected 1 data pass on to enhance our screening as well as additional targets of opportunity as we fly. If weather permits, we plan to hit the coastline first then go counterclockwise along the eastern shore -> NOLA -> Mississippi River -> BTR.

Thanks,
Ed

Edward Argenta Jr
Branch Chief
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CBRN Consequence Management Advisory Division
Office of Emergency Management
Argenta.edward@epa.gov
Gov't Mobile: 202.843.4511
Office #: 202.564.4528
Office: WJC-N - B517R

From: Argenta, Edward
Sent: Monday, September 6, 2021 9:01 AM
To: McKown, Cody <cody.mckown@fema.dhs.gov>; Russell, Glen <glen.russell@fema.dhs.gov>; Mak, Morgan <morgan.mak@fema.dhs.gov>; Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) <Kevin.N.Herr@uscg.mil>
Cc: Honnellio, Anthony <Honnellio.Anthony@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; Pandey, Siddharth (CTR) <siddharth.pandey@associates.fema.dhs.gov>; Perovich, Gina <Perovich.Gina@epa.gov>; Jakabhazy, Elise <Jakabhazy.Elise@epa.gov>
Subject: RE: EPA ASPECT Mission Plan for Hurricane Ida Response - 20210906

All,

EPA ASPECT has scrubbed their mission planned for 20210906 due to the storms in the area and the forecast for later in the afternoon. We are returning back to Home Base – Addison, TX for the day/evening. We are watching weather for tomorrow (09/07/2021) as Ops may be impacted again. We'll provide an update around 0730 CST on 20210907 of our plans for the day.

Please let me know if you have any questions,
Ed

Edward Argenta Jr
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
Argenta.edward@epa.gov
Gov't Mobile: 202.843.4511
Office #: 202.564.4528
Office: WJC-N - B517R

From: Argenta, Edward
Sent: Monday, September 6, 2021 12:37 AM
To: McKown, Cody <cody.mckown@fema.dhs.gov>; Russell, Glen <glen.russell@fema.dhs.gov>; Mak, Morgan <morgan.mak@fema.dhs.gov>; Herr, Kevin N LT USCG SOUTHCOM JIATFS J2 (USA) <Kevin.N.Herr@uscg.mil>
Cc: R6 RRC <R6_RRC@epa.gov>; Delgado, Eric <Delgado.Eric@epa.gov>; Mekeel, Edward <mekeel.edward@epa.gov>; Fisher, Bray <fisher.kelsey@epa.gov>; Honnellio, Anthony <Honnellio.Anthony@epa.gov>; Moore, Gary <moore.gary@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; Pandey, Siddharth (CTR) <siddharth.pandey@associates.fema.dhs.gov>; Perovich, Gina <Perovich.Gina@epa.gov>; Jakabhazy, Elise <Jakabhazy.Elise@epa.gov>
Subject: EPA ASPECT Mission Plan for Hurricane Ida Response - 20210906

All,

Please find the attached summary of EPA ASPECT activities as of 20210905 related to our support to the Hurricane Ida response. Please note, the slide has changed and we have symbolized the dates we performed our initial screening of the LDEQ& EPA priority facilities. EPA ASPECT has 1 site remaining on our POI list and plans to perform additional data collects on high priority facilities or additional POIs on 09/06/2021. Weather may impact our operations on 09/06/2021.

Respectfully,
Ed

Edward Argenta Jr
Branch Chief

Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
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Office: WJC-N - B517R

From: Argenta, Edward
Sent: Saturday, September 4, 2021 11:58 PM
To: 'McKown, Cody' <cody.mckown@fema.dhs.gov>; 'Russell, Glen' <glen.russell@fema.dhs.gov>
Cc: R6 RRC <R6_RRC@epa.gov>; Delgado, Eric <Delgado.Eric@epa.gov>; Mekeel, Edward <mekeel.edward@epa.gov>; Fisher, Bray <fisher.kelsey@epa.gov>; Honnellio, Anthony <Honnellio.Anthony@epa.gov>; Moore, Gary <moore.gary@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; 'Pandey, Siddharth (CTR)' <siddharth.pandey@associates.fema.dhs.gov>; Perovich, Gina <Perovich.Gina@epa.gov>; Jakabhazy, Elise <Jakabhazy.Elise@epa.gov>
Subject: EPA ASPECT Mission Plan for Hurricane Ida Response - 20210905

Please see the attached summary slide for 9/4 execution and 9/5 plan. We successfully screened 19 locations on 9/4 and will attempt to get to ~25 sites on 9/5.

Thanks,
Ed

Edward Argenta Jr
Branch Chief
Field Operations Branch
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Office of Emergency Management
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Office #: 202.564.4528
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From: Argenta, Edward
Sent: Friday, September 3, 2021 11:14 PM
To: McKown, Cody <cody.mckown@fema.dhs.gov>; Russell, Glen <glen.russell@fema.dhs.gov>
Cc: R6 RRC <R6_RRC@epa.gov>; Delgado, Eric <Delgado.Eric@epa.gov>; Mekeel, Edward <mekeel.edward@epa.gov>; Fisher, Bray <fisher.kelsey@epa.gov>; Honnellio, Anthony <Honnellio.Anthony@epa.gov>; Moore, Gary <moore.gary@epa.gov>; Taylor, Jillianne <Taylor.Jillianne@epa.gov>; Pandey, Siddharth (CTR) <siddharth.pandey@associates.fema.dhs.gov>; Perovich, Gina <Perovich.Gina@epa.gov>
Subject: EPA ASPECT Mission Plan for Hurricane Ida Response - 20210904

Hi All,

Please find the attached slide which summarizes what we accomplished to date (black icons), our plan for 20210904 (blue icons), and the remaining facilities to screen (red/orange icons). You'll find our planned flight times and record of today's(20210903) flight hours. If you'd like this information in a different method/format or would benefit from a table of GPS locations for our planned activities please let me know.

Respectfully,
Ed

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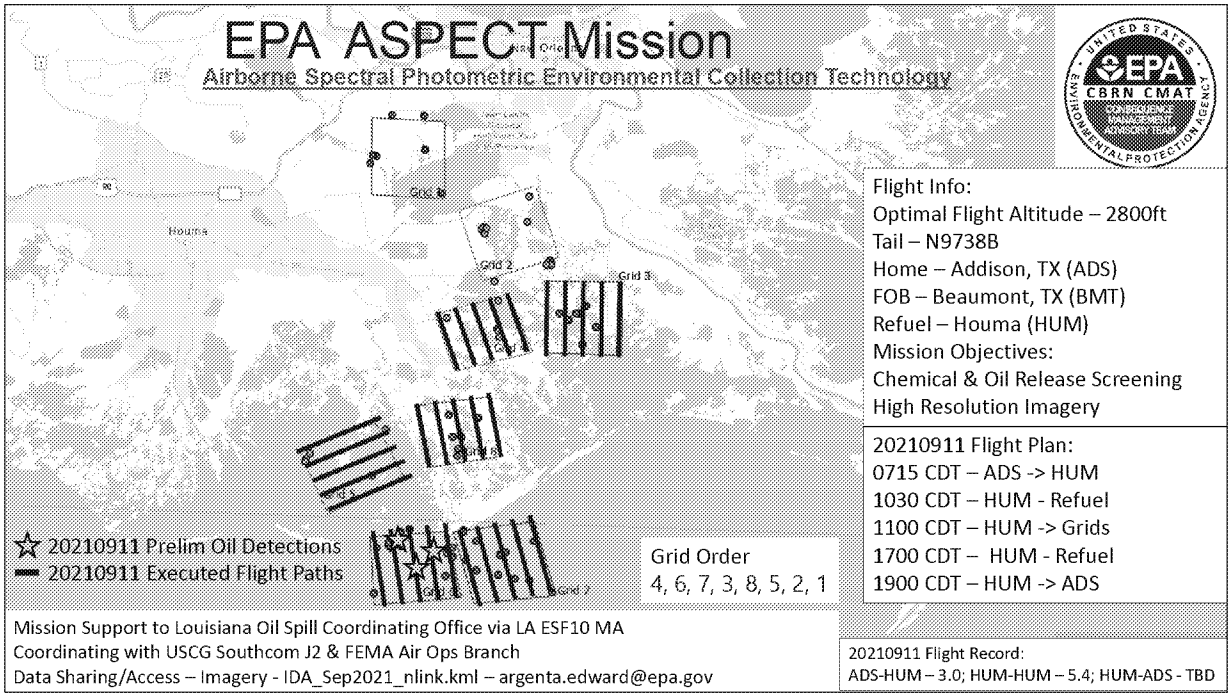

Cessna 208B Super Cargo Master Platform - Addison, TX
Range/Aloft Time: Range 1,200 NM; Aloft Time 4 – 6 hours

- An Infrared Line Scanner to image chemical plumes
- A High Speed Infrared Spectrometer to identify and quantify the composition of the chemical plume in the ppb to ppm range
- Gamma-Ray Spectrometer for radiation detection and isotope identification
- Neutron Detection System for enhanced radiological detection
- High resolution digital cameras (aerial & oblique) with ability to rectify for inclusion into GIS
- Broadband Satellite Data System (SatCom)